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HARRAP'S NEW GEOGRAPHICAL SERIES

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THE COUNTRIES OF THE WORLD

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GEORGE G. HARRAP & CO. LTD.
LONDON BOMBAY SYDNEY

First published 1932
by GEORGE G. HARRAP & CO., LTD.
39-41 Parker Street, Kingsway, London, W.C.2

PRINTED IN GREAT BRITAIN AT THE PITMAN PRESS, BATH

PREFACE

THIS book has been written with the aim of presenting a general view of world geography to pupils at the School Certificate stage. This is the highest stage to which the majority of boys and girls carry their study of geography. It is important, therefore, that they should acquire before leaving school such a knowledge of the world as the average citizen needs.

A second consideration has been that as a text-book it will be used to supplement oral teaching. Geography is increasingly taught by those who have special training in the subject, but there are still many non-specialist teachers. The former often make comparatively little use of the text-book, while the latter are inclined to rely too much upon it. As a result their pupils are in danger of leaving school either with a knowledge that is stimulating and detailed in some directions but lacking in balance as a whole, or with knowledge of an even but monotonous level, soon forgotten, and destructive of further interest in the subject. This book seeks to meet the needs of both types of pupil by dealing with world geography first as a whole and then region by region in such a way that it can be read by pupils independently of the kind of teaching they receive. The book is intended to be read in conjunction with a good atlas.

The main theme throughout is the human aspect. Physical geography is introduced only to explain human distributions and activities. In the same way the treatment of climate is descriptive rather than explanatory. The writer also has not hesitated to introduce facts of political and historical geography. The world situation forces itself upon us whether we wish to understand it

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or not. It is impossible to get a clear grasp of the world as a unit, and of the complexities of the economic relations of mankind, without some understanding of political factors. Many of the difficulties of the world to-day would be reduced by a better understanding of international rather than national needs.

The first part of the book, therefore, deals with the world as a whole, the expansion of man's knowledge of it, man's conquest of nature and its reactions, and the result of these activities upon present political frontiers. Though of necessity somewhat brief, this section is important for the stress it lays upon international relations and the work of the League of Nations. The rest of the book describes the world region by region, for although each country is treated separately that treatment is prefaced in the case of each continent by a consideration of the natural regions and their climates. As an aid to memory, comparisons of similar regions or of geographical factors are made frequently. In the same way quantitative economic facts are wherever possible given in percentages. How far the difficulty of supporting generalizations with adequate facts without interrupting the interest of the narrative has been overcome is for others to judge. Lists of questions tend also to break rather than help continuity, and are therefore omitted. Care has been taken to ensure that the facts given are as far as possible accurate.

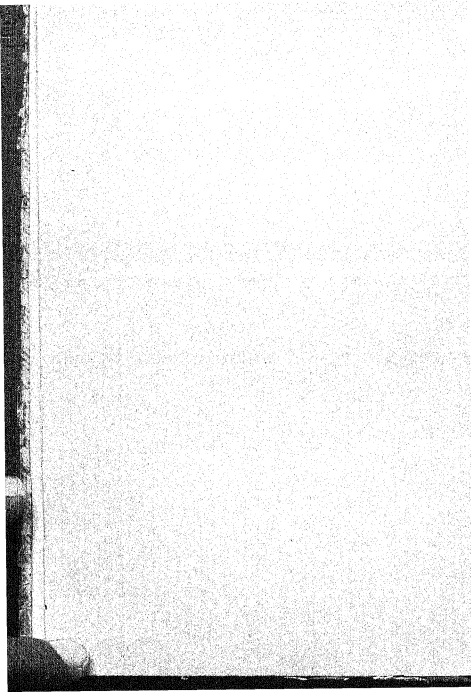
The author is particularly grateful to the editor of this series for much valuable help with the text, and to his colleague Mr J. Corley, M.Sc., for undertaking the drawing of those diagrams which have been specially prepared for this book, and for useful comments. Among the books to which he is deeply indebted, and from which he has been allowed to take certain maps and diagrams, are *The New World*, by Isaiah Bowman; *Modern Business Geography*, by E. Huntingdon and S. W. Cushing; *Africa and Australia and New Zealand*, by L. S. Suggate; and *The Home of Man*, by W. C. Brown and P. H. Johnson. He has also to

PREFACE

express his obligations to *Great Britain : Essays in Regional Geography*, by twenty-six authors; *The Climates of the Continents*, by W. G. Kendrew; *Frontiers*, by C. B. Fawcett; *Human Geography*, by Jean Brunhes; *The Statesman's Year-Book*; and the year-books and other publications generously put at his disposal by the Dominion Governments. Grateful thanks are likewise due to several friends for information acquired by residence in distant parts of the world; and, finally, to the publishers for permission to use many valuable illustrations, diagrams, and maps.

A. M. D.

June 1932



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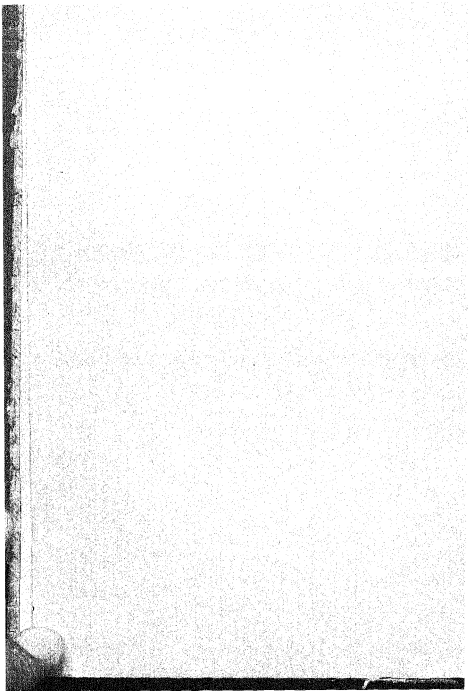
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PART I

POLITICAL GEOGRAPHY— WORLD UNITY

CHAPTER I

THE UNVEILING OF THE WORLD

THE countries of the world to-day are much more united by bonds of common interests than separated by time and space. This fact, easily stated and readily admitted, is not, however, so easily grasped. It is therefore necessary to stress at the outset that this bond of unity is the key to the study of the life and work of man the world over. It must constantly be kept in mind.

Without it geography more than any subject becomes a mere mass of detail, bewildering and burdensome. Once this underlying unity is really understood, however, the subject becomes clear-cut, and provides a firm foundation for every form of human activity and a lifelong interest.

Man's knowledge of the world has grown with increasing rapidity down through the ages. To prehistoric man the world was extremely limited, being merely the part round his home over which he could range, surrounded by the unknown area, full of terrors. When, after many centuries, he became civilized, he began to draw maps, or, rather, diagrams indicating his own region, together with what he guessed the rest to be. Some of these guesses were remarkably near the truth.

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The Mediterranean region was the nursery of civilized man. To Homer the centre of the world was the Ægean Sea; to Herodotus, himself a traveller, but also a narrator of the travels of others, the world had expanded to include the whole Mediterranean region and the Near East—

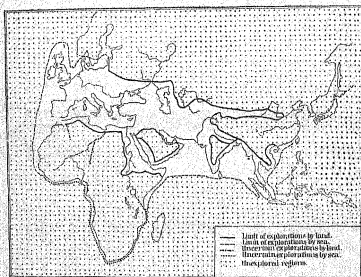


FIG. 2. THE WORLD AS DISCOVERED BY ANCIENT EXPLORERS

i.e., Arabia, Egypt, Asia Minor, Persia, and the Caspian Sea.

The Roman carried his conquests far and wide, until he claimed that his power extended over the whole inhabited world. Yet of Britain or Germany he had but the vaguest of ideas. Of Africa south of the Sahara, of the Americas, and of Australia he knew nothing, and of China only a few tales.

During the Middle Ages, following the fall of Rome, much of this Roman world became again obscured in mists of ignorance. Weird diagrams of a flat world, sur-

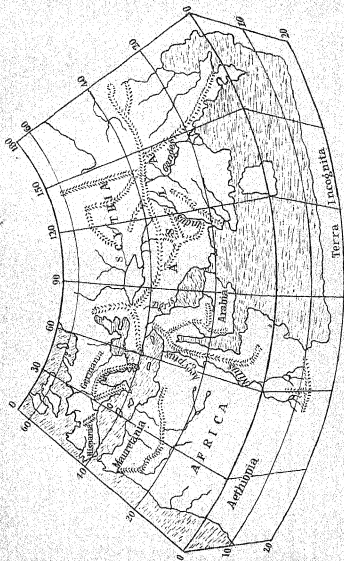


FIG. 3. THE WORLD KNOWN TO PTOLEMY, A.D. 140

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rounded by mysterious oceans, and crowned with representations of Paradise, replaced the work of the Greek geographers, which was founded upon clear thinking and scientific methods of investigation; for example, Eratosthenes in the third century B.C. compiled a summary of the world as he knew it, and tried to measure it on scientific lines, while Ptolemy's maps remain marvels of skill. It is significant that both these great geographers lived at Alexandria, one of the four cities founded by Alexander the Great and named after him.

By bringing us into conflict with the Arabs the Crusades did much to dispel false notions, and gradually men strove to learn the real facts about the world. The religious fervour of the Arabs after the death of Mohammed in the seventh century enabled them not only to carry their faith both westward along the north of Africa across into Spain and eastward toward India, but also to obtain mastery of the sea by use of the compass. This expansion of Arab power cut off the route between Europe and India. Merchants then had to look for other routes for trade with the East, and gradually the great land routes to India and China were opened up by Marco Polo and others. For a time, about the thirteenth and fourteenth centuries, Venice and Genoa were the chief centres for these eager enterprises. Then in the fifteenth century the genius of Prince Henry of Portugal, generally known as "the Navigator," made Portugal the nation with most up-to-date geographical knowledge. His work was followed up by the great voyages of Bartholomew Diaz to the Cape in 1486 and of Vasco da Gama round it and across the Indian Ocean in 1498. Meanwhile Columbus had crossed the Atlantic to America in 1492, and Magellan in 1520-22 sailed round the world. The Mediterranean thus ceased to be the focus of man's activities. Europe began to look westward across the great ocean. Spain, in search of gold, stumbled across rich and civilized races, the Aztecs in Mexico and the Incas in Peru. Portugal reaped the

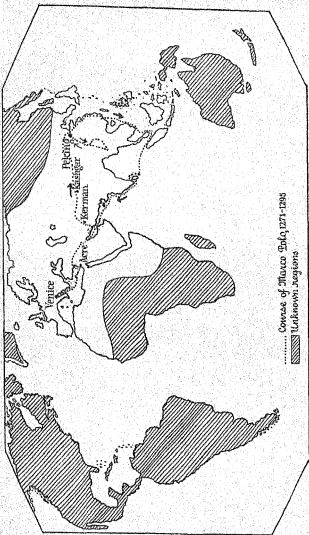


FIG. 4. THE KNOWN WORLD BEFORE THE GREAT VOYAGES OF THE FIFTEENTH AND SIXTEENTH CENTURIES

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reward for the work of her pioneers by securing Brazil, and also by establishing trading stations along the coasts of Africa and Southern Asia.

The British and French soon interested themselves in the coast of North America, as the voyages of Cabot in 1497 and of Cartier in 1535 indicate. But permanent colonies were not successful till the seventeenth century. In the endeavour to find a way for themselves to the east many brave attempts to navigate the North-west Passage, and later the North-east Passage, were undertaken by Fro-bisher, Gilbert, Davis, Hudson, and others. Both have been successfully achieved in modern times, the North-west by Amundsen in 1906 and the North-east in 1879 by Baron Nordenskiöld.

During the eighteenth and nineteenth centuries the coast of Australia was explored by the Dutch and by Captain Cook, and later by Bass and Flinders.

Exploration of the interiors of both Australia and Africa took place chiefly in the latter part of the nineteenth century. The reasons for the apparent delay will be examined when we consider the respective continents.

Similarly, more was learned, but much remained still to be learned, of the interior of Asia, and the North and South Poles were not conquered till the beginning of the present century. Peary reached the North Pole in April 1909 and Amundsen, who forestalled Scott, the South Pole in December 1911.

So that only in our own day man has succeeded in conquering what seemed impenetrable parts of the world's surface. But while these outposts were being visited for the first time, man has been busy uniting the continents by visible and invisible ties, by cable and wireless, by steamship, railway, and aircraft, and by the strongest bond of all—that of kinship and mutual understanding.

The more widely knowledge of the world spreads the better the understanding will be. But man has discovered this truth only as the result of his conquest of the un-

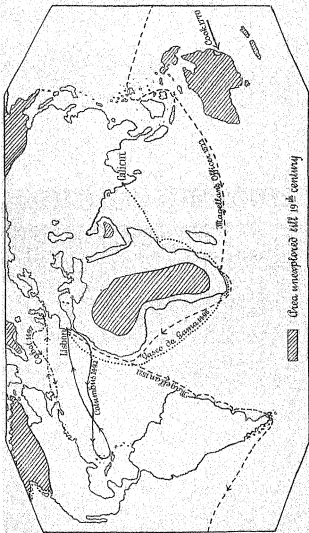


FIG. 5. THE GREAT VOYAGES OF DISCOVERY IN THE FIFTEENTH AND SIXTEENTH CENTURIES
 Shaded area explored till the nineteenth century.

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known. The motives which have prompted him throughout the ages to endure hardship and to face untold danger and death are very varied. Primitive man explored the unknown in search of better food and shelter. The Greeks sought to solve the secrets of the world for the love of knowledge and for trade. The Romans became absorbed in conquest. In the Middle Ages, and frequently since, religious zeal has provided the motive. That great awakening known as the Renaissance fired man's imagination and aroused a widespread desire for learning. Closely allied with this thirst for knowledge was the desire to trade, and the need of safe routes led to the great voyages. Knowledge created an appetite for more, and the increased freedom to think and to translate thought into actions led to inventions which made possible the great discoveries. The magnetic needle and the compass (probably brought by Marco Polo from China) enabled Columbus to give the lead in making voyages out of sight of land—a lead quickly followed with wonderful results. Gunpowder enabled Europeans to conquer the New World. Printing, by reviving the mathematics and science of the Greeks, led to developments in astronomy and navigation.

In the seventeenth and eighteenth centuries further discoveries were prompted by mixed motives of conquest and trade. From the eighteenth century onward many discoveries have been due purely to a love of adventure, or quest for scientific data. Almost invariably new discoveries have stimulated trade rivalry, which in time has compelled the Governments of European countries to take control, with the result that the whole world has been parcelled out. At first European countries managed their colonies purely for their own profit. That mistake cost Spain dearly, and lost for us the American colonies. During the last half of the nineteenth century the changed conditions in European nations brought about by all the inventions which are associated with the Industrial Revolution resulted in national rivalry, shown in the scramble

THE UNVEILING OF THE WORLD

for possessions in Africa and elsewhere. But the world has been learning since—the Great War being one of its lessons—that the prosperity of one nation depends very largely upon the others being prosperous too; that vital questions like the supply of wheat, the control of fisheries, protection from disease and so forth, are the concern of all. The former German colonies have not become spoils of war to the victors, but are managed by a selected country, under the supervision of the League of Nations, and managed in the best interests of its inhabitants, not for selfish profit. *of course*

It is that spirit which makes the British Empire such a force in the world. The dominions are not possessions, but part of 'us.' They are entirely free in reality, yet they are one, because they have the same ideals—of justice, of freedom, of progress, the same love of knowledge and of sport. Their trade interests are so diverse that prosperity depends upon agreement among themselves. This great example of unity is spreading through the world, and there is reason to hope that all the countries will in time combine in one great fellowship of peaceful development and progress.

CHAPTER II

THE WORLD A SPHERE

WE all know that the world is not a cube or a flat plain surrounded by sea, nor any of the other shapes which the ancients guessed it to be, but that it is a ball moving in space. The proofs that this is true are easy to grasp.

On a flat world the time of sunrise or sunset would be the same everywhere. Ships could not sail round it as they do, setting out in one direction and returning from the opposite. Ships approaching the coast are first seen partly concealed by the horizon, smoke, funnels, and rigging becoming visible before the hull. The horizon (the line where earth and sky appear to meet) is always circular; the circumference of this circular horizon increases with the height of the view-point. Seen from a height of 100 feet the horizon lies about thirteen miles away; from a height of 1000 feet it is over forty miles away. This can be true only for a sphere. In constructing canals engineers have to allow about eight inches per mile for curvature, even where the surface of the ground appears quite flat. In eclipses the earth's shadow is always circular. The other planets too, as well as the sun and the moon, are observed to be spheres. For all these reasons there can be no doubt that the earth is a sphere in space.

Great-circle Sailing. The world being for all practical purposes a sphere, movement over its surface must always be along the circumference of a circle. This fact becomes of great importance when large distances have to be traversed in the shortest possible time. The shortest distance would be along the straight line joining

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the two places, but this line always passes through the globe. The shortest distance along the surface is that part of the circumference that most nearly approaches a straight line—*i.e.*, the circumference of the largest possible circle. For the smaller the circle the less like a straight line is any part of the circumference.

Every one is familiar with those circles on a globe which pass through the Poles and with the circle called the equator. These are all great circles. But any number can be drawn in any direction which are all great circles provided that their planes pass through the centre of the world. All circles whose planes do not pass through the centre are smaller in circumference, and therefore more curved; for example, the parallels of latitude north and south of the equator are circles, but not great circles, and they get smaller and smaller as they approach the Poles.

Even sailing-ships, dependent though they are so largely upon winds and currents, used great-circle sailing whenever possible. Steamships can follow this course more closely, but naturally aircraft can make use of this principle most easily of all. It is obviously of great economic importance. Lessening the distance means shortening the time, economizing on fuel, and saving on wages and maintenance, and thus, by making it possible to complete more journeys within the year, secures a bigger return for expenditure.

But it involves skill in navigation. Los Angeles, lat. $34^{\circ} 5' N.$, and Yokohama, lat. $35^{\circ} 30' N.$, lie approximately east and west of each other. But a course sailed westward from Los Angeles would lie along a parallel of latitude—*i.e.*, along the circumference of a smaller circle. The shortest great-circle course—best found by a circular measure on the globe—entails sailing first north of west and later south of west.

Land and Sea. The orderly arrangement of the continents over the earth's surface strikes every one who

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examines a globe. Several attempts have been made to explain it. The Tetrahedron Theory is one of the most useful in helping us to remember the main facts.

A sphere has the smallest possible surface in relation to its volume. A regular tetrahedron has the largest surface for its volume, and is bounded by four equilateral triangles. The theory is that the world in cooling has gradually adjusted its surface from the one in the direction of the other.

The continents appear to arrange themselves along the edges of the tetrahedron, and the oceans to occupy the

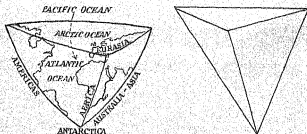


FIG. 6. TETRAHEDRON (WITH CURVED SIDES) SHOWING POSITIONS OF CONTINENTS ON EDGES AND OCEANS ON CAVED-IN FACES

For purposes of comparison a regular tetrahedron is shown on the right-hand side.

faces of the triangles. The Arctic Ocean occupies the centre of one face, and is surrounded by the continental masses of Asia and North America. The land extends southward along the other edges of the solid in three lines—the Americas, Europe-Africa, and East Asia-Australia. In the extreme south where the three edges meet, lies the continental mass of Antarctica opposite the face containing the Arctic Ocean.

Another striking feature, which has long attracted the notice of geologists, is the similarity of coast-line between the eastern coast of America and the opposite shores of the Atlantic. If a sheet of plasticine were applied to a globe and cut to the shape of the continents, then brought

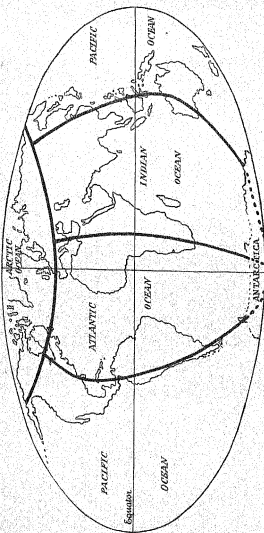


FIG. 7. THE DISTRIBUTION OF LAND ROUND THE EDGES OF THE TETRAHEDRON
Edges shown by thick lines.

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together, they would roughly fit the one into the other. The Wegener Theory is that the continents have drifted apart owing to the lighter density of the rocks composing

them as compared with the heavier substratum on which they rest. Nothing has yet been proved, but it is worth remembering when comparing the continents that the feature is so marked as to attract the serious attention of scientists.

Still another aspect of the distribution of land and water should be carefully noted. This is best done with the globe, but the following diagram illustrates the point. Notice that the British Isles form the centre of the land hemisphere. Similarly New Zealand is the centre of the water hemisphere. The British Isles and New Zealand thus occupy approximately opposite ends of the diameter of a great circle joining them, the one forming the

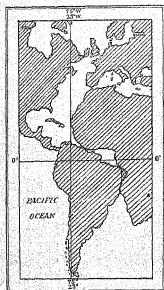


FIG. 8. DIAGRAM SHOWING SIMILAR SHAPE OF EAST AND WEST ATLANTIC COASTS MOVED 50° NEARER TO EACH OTHER

To illustrate Wegener's theory of drifting continents.

antipodes of the other. Spain is the actual antipodes of New Zealand.

As men's knowledge of the world grew the centre of importance for civilized man moved from Tyre to Alexandria, then to Venice and Genoa; and then, after the great exploits of Vasco da Gama and Columbus, out of the Strait of Gibraltar to Lisbon and Seville. It thence passed to the Netherlands, and, later, to London. The

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reason is clear. Access from Britain to all the other white man's lands where civilization has developed is easy in all directions. And, further, its central position brings it on several of the world's greatest highways of traffic. Contrast the position of New Zealand, on the other hand, which has only Australia as a neighbouring

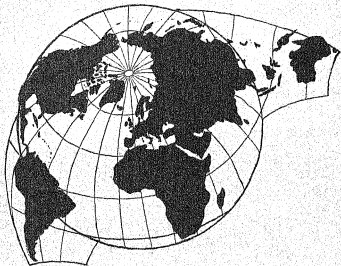


FIG. 9. THE BRITISH ISLES AS THE CENTRE OF THE LAND HEMISPHERE

white man's land, and that is over 1000 miles farther away than the European coast is from Britain. In all other directions there is some 6000 miles of open sea, much of it little frequented.

Land occupies only about three-tenths of the total surface of the world. The volume of the land above sea-level is only about one-thirteenth of the volume of the sea. If this land were used to fill the deep parts of the oceans and then spread out to one level its surface would lie nearly a mile and a half deep. But for the constructive

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forces at work—volcanoes which pour out lava and ash, and earth movements which uplift parts of the earth's crust—it would be but a matter of time before the land of the world disappeared into the sea. For there are many forces at work which destroy rocks as soon as they are exposed to sun and air. Rocks crumble under the influence of rapid changes of temperature, frost, chemical action of air and rain-water, sea waves, wind, and wind-blown sand. The fragments are always being carried to lower levels by the force of gravity and by the action of running water and moving ice.

Of the total land of the world the Northern Hemisphere contains two-thirds. Surrounding the depression of the Arctic Ocean at a distance of about 20° from the North Pole are the northern coasts of the great continental blocks of Eurasia and North America. The breaks are the shallow waters of the North Atlantic separating Greenland from the continents, and the narrow Bering Strait. Southward there is a great expanse of lowland in both continents. These lowlands are composed of ancient undisturbed hard rocks forming, as it were, great shields against which the younger rocks were forced into mighty folds and faults by the thrust due to the shrinkage of the earth's crust. In North America these plains extend to the Gulf of Mexico with only a low watershed to separate the northward flowing rivers from those which flow to the south. But in Eurasia the plains terminate in a great series of mountain ranges trending from west to east. Trace the course of this system of mountains. Begin with the Pyrenees and follow the Alps, Carpathians, Balkans, Caucasus, Elburz, Hindu Kush, Kuen-lun, and the Himalaya ranges. Note also how other ranges diverge from and rejoin the main system, enclosing either great plateaux or depressions. Thus from the Alps run the Apennines, the mountains of Sicily, the Atlas ranges of North Africa, which turn northward, are cut by the Strait of Gibraltar, and continue in the Sierra Nevada of

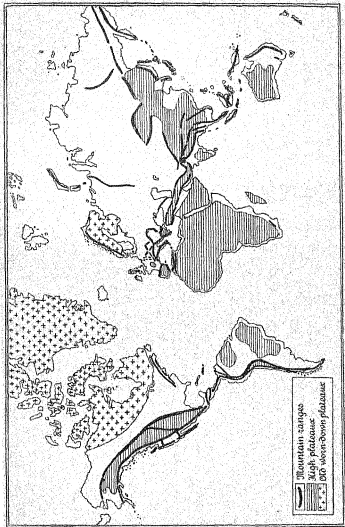


FIG. 10. THE CHIEF MOUNTAIN RANGES AND PLATEAUX OF THE WORLD

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Spain. Similarly, the Dinaric Alps, the Pindus mountains, and the mountains of Crete and Cyprus mark out the path of another loop, rejoining the main system in Armenia. Asia Minor is enclosed between the Pontine and Taurus ranges. Eastward of Armenia the plateau of Iran is enclosed between the Elburz and Khorasan mountains in the north and the Kurdistan and Zagros mountains in the south, the two converging in Afghanistan and the Pamirs. South-eastward from the Pamirs, the Himalayas, on the south, and Kuen-lun, on the north, enclose Tibet. Between the line of the Kuen-lun, Nanshan, and Khingan ranges and the northern ranges of the Tien-shan, Altai, Sayan, and Yablonoi mountains are the Tarim and Gobi depressions. This mid-world mountain system contains the highest and broadest highland masses of the world. It forms a great barrier not only to communications but to climatic influences, and has profoundly affected the distribution and movements of mankind.

Next to this massing of land in the Northern Hemisphere, notice how land tapers away southward. There are three such continental branches:

- (a) The Americas, flanked on the west by the Rockies and other ranges and the Andes, reaching to 56° S.
- (b) Euro-Africa, with highlands along the eastern side of Africa, reaching to 35° S.
- (c) The Asia-Australia branch through Farther India, the Malay islands, and the eastern highlands of Australia, reaching to 40° S.

Each of these arms of land is deeply cut by intrusions of the sea north of the equator: the Americas by the Gulf of Mexico and the Caribbean Sea between latitudes 10° N. and 30° N.; Euro-Africa by the Mediterranean about 35° N.; and Asia-Australia by the Malay archipelago about the equator.

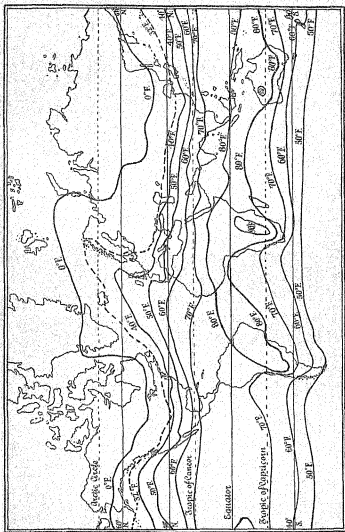


FIG. 11. JANUARY ISOTHERMS AT SEA-LEVEL

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Between them are the ocean basins, tapering northward, as the continents do southward. The Atlantic is the longest with openings to both the North and South Polar areas, both comparatively wide; the Pacific is much the broadest, and is nearly enclosed in latitude 65° N., but is wide open in the south; the Indian Ocean is the smallest, quite enclosed in the north and reaching only to about latitude 25° N. Examine a globe and note how these continents and oceans are distributed one against the other on opposite sides of the world: on the one side the Pacific, on the other Euro-Africa; the basin of the North Atlantic opposite the land block of Australia; the basin of the Indian Ocean opposite North America (but South America is opposite the islands of the Western Pacific); and at the Poles the Arctic Ocean opposed by the land mass of Antarctica. Note also that each of the land masses south of the equator—South America, the southern half of Africa, and Australia—lies to the east of its northern counterpart; for example, South America between longitudes 35° – 81° W., North America between longitudes 55° – 168° W. The sea forms a continuous belt around Antarctica, and the oceans form three northward extensions of it, fitting in between the southward extensions of the land. As most of the land masses are broadest in the north and taper almost to a point in the south, the proportion of sea to land in the Southern Hemisphere is about five to one. The Atlantic is fringed by coastal plains drained by mighty rivers like the Mississippi, Orinoco, Amazon, and Plata on the west, and, on the east, the Elbe, Rhine, Niger, and Congo, as well as those which flow into the Baltic and Mediterranean basins.

The Pacific, on the other hand, is fringed by lofty mountains, some of the deepest portions lying close to the coasts. It is fed by few great rivers, the Amur, the Hwang, and the Yang-tse alone ranking for comparison with those feeding the Atlantic.

The Indian Ocean is encircled by highlands, but they

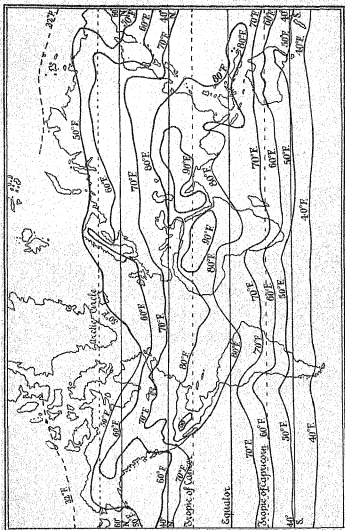


FIG. 12. JULY ISOTHERMS AT SEA-LEVEL

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are not so continuous as the mountains around the Pacific, and consequently more large rivers like the Tigris, Euphrates, Indus, Ganges, Irrawaddy, and the Murray, flow into it.

Since the largest portion of the land lies north of the equator, the countries of the northern continents experience a great difference between summer and winter, while the countries of the southern continents enjoy much more even climatic conditions as a result of the tapering of the land and the high proportion of sea.

The coldest areas apart from the lofty Antarctic continent and high plateau of Greenland, are found on the northern plains which slope away from the sun. These northern plains of Asia are open to cold winds from the north and sheltered from warm winds from the south. On the other hand, the plains which lie to the south of the great Eurasian barrier and slope towards the sun are protected on the north, and open to warm, moist winds from the Atlantic, Indian, and Pacific Oceans.

The northern plains have relatively little rainfall, but these southern plains have great rainfall at certain seasons. These conditions favour the growth of crops, and thus encourage dense populations. Here man evolved the oldest known civilizations of Assyria, China, Egypt, India, Persia, Greece, and Rome.

CHAPTER III

NATURE AND MAN

MAN's distribution over the world has been dominated by the forces of Nature, and although with increasing knowledge he has in many ways been able to overcome the difficulties of his environment Nature remains supreme.

The primary needs of mankind are: (1) food and drink; (2) shelter and safety; and (3) clothing and warmth. To ensure the first he must fashion weapons and utensils for domestic use; his home requires tools and means of defence, while the securing of clothing and warmth requires foresight and the accumulation of stores which can be used for trade; in other words, he collects wealth.

These needs are satisfied with little effort in some parts of the world, while in others they absorb man's energies entirely. Where either the conditions of life are too easy or too difficult man remains a primitive being. The best types of mankind are found where man is compelled by Nature to work and to overcome difficulties, but is rewarded for his efforts with comfort and plenty.

Let us examine some of the chief factors which influence the unequal distribution of natural gifts.

THE EFFECT OF CLIMATE

1. *Equatorial Regions.* In these regions continual great heat, combined with abundant moisture, so favour plant life that man is unable to clear the ground for crops. The conditions discourage great exertion. Such, indeed, is often unnecessary, as the forest provides him either with sufficient fruit and seeds for food, or, more usually, with products with which to purchase food, like raw rubber

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and dye-wood in Brazil and Congo, or sago in Papua, or palm oil in West Africa, besides animal products—meat, hides, skins, wings, and feathers.

2. *Tropical Regions.* North and south of the equatorial regions conditions gradually change. The chief feature which distinguishes the tropics is the dry season. This leads to a thinning out of trees and enables the grasses to establish themselves, so that savanna land has a park-like appearance. The trees develop devices to save water, like thorns in place of leaves, fewer leaves with thicker or hairy covering, or leaves that can turn edgewise to the sun, like the eucalyptus in Australia.

Here, then, herds of antelope, deer, and buffaloes flourish on the more open expanses, while big game—elephants, rhinoceroses, giraffes, zebras, and lions—throng the edges of the forest or the patches of woodland. Here it is easier for man to cultivate crops, but we find him more usually engaged in hunting or pasturing animals.

3. *Sub-tropical Regions.* Outside the tropical regions we pass into areas which enjoy a warm though temperate climate. Here conditions vary according to the position as regards the whole continent, whether on the west or on the east or in the interior. Those on the west, of the Mediterranean type, have hot, dry summers and mild winters with winter rains. Those on the east of continents, like the plains of China, have a more extreme summer and winter, with most rain in summer. The interior regions suffer from extremes of temperature and scanty rain. Thus, for the most part the dry season is prolonged; rainfall is often scanty, and occurs only at one season. These regions have been the cradles of civilization—the Mediterranean on the west and China on the east.

4. *Hot Desert Regions.* Stretching across North Africa far into Asia occurs a great belt of deserts where rain falls only at long intervals, and then chiefly in the form of sudden thunderstorms. Here water is found only at



FIG. 13. MEAN ANNUAL ISOTHERMS AT SEA-LEVEL

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oases, and man has a struggle for existence. Man must either wander with his animals along the outer areas, where scanty pasturage is found, or settle permanently round an oasis, under the date-palms. Deserts then are, like the sea, difficult to traverse, easy to lose one's way in, lacking in fresh water, and thus form the greatest barrier to man. This is one reason why the interior of Africa remained so long unknown to Mediterranean peoples.

5. *Maritime and Continental Temperate Regions.* These are the favoured regions of the world. Those parts under the influence of winds from the sea enjoy equitable temperatures, with rain at all seasons—the most in winter—and all the advantages of settled occupations of commerce in every form. But in the heart of the continent, away from the influence of the sea, the winters are cold, and there is much less rain, and that chiefly in storms during the hot summer.

6. *Cold Regions.* Areas like the plains in Northern Siberia or Northern Canada have the same shortage of water, and therefore of plant and animal life, as the hot deserts. Snowclad most of the year, water is only available for a few weeks during the summer. Man's outstanding quality here is sheer endurance, for he has to be contented with a bare subsistence. On highland areas, where snow collects and never melts, there are lifeless deserts.

THE EFFECT OF OTHER FACTORS

Climate exercises the greatest influence upon the distribution of man. But the relief of the land, particularly *mountains*, is a great obstacle to man's activities. Approximately every 400–500 feet of elevation makes as much difference in temperature as 1° of latitude. Mountains, too, isolate peoples. They compel inhabitants to live a special form of life due to their ruggedness, their colder climate, and their poverty. Except in favoured

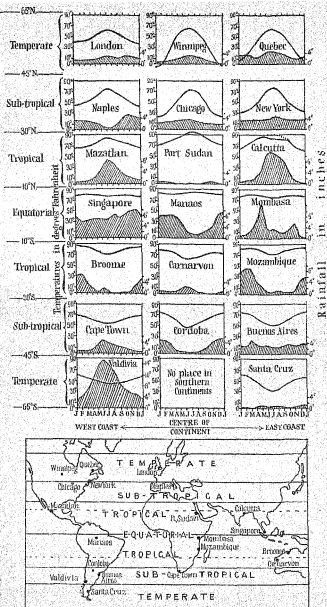


FIG. 14. REGIONAL RAINFALL AND TEMPERATURES

Note Calcutta: reduced maximum temperature due to cloud screen in 'rainy' season.

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valleys, they are thinly peopled. Where deserts occur amid mountainous surroundings they form the greatest barrier to man, as in the case of the Himalayas and Tarim, or the Rockies and the Great Basin.

Forests often repel man's efforts to conquer them. The tropical forests of South America, Africa, and the East Indies seem unconquerable, but the coniferous forests of Canada and Eurasia are only less a barrier. Mountains are often forested, thus adding to man's difficulties there. Temperate forests are more easily subdued.

Wide *marshes*, such as occur in West Russia and Poland, in large deltas, or even the Fens of England, have presented great obstacles to man, and are overcome only by immense labour and expense.

These are the chief factors which have brought about the unequal distribution of man on the earth. If you examine the map showing density of population certain large areas stand out boldly. If 100 per square mile over a large area is taken as a test of density, then the plains of China, the Ganges valley, most of the coast of India, together with much of the Deccan, the Nile valley, most of Europe, the British Isles, and the United States of America east of the Great Lakes are conspicuous. No given set of reasons is applicable to all these cases. In the monsoon lands of China and India the primary cause is *intense fertility of soil*. These are lands where the rice plants give a prolific yield for food, and cotton grows well and provides clothing. In addition such crops as the sugar-cane, maize, and fibre plants do well, and the mulberry-fed silk-worm produces its golden thread to provide light yet warm clothing for its owners and wealth in exchange. These are the regions where climatic conditions enable man to thrive on his simplest diet and with a minimum of clothing and shelter. So that here, from the earliest times, mankind has settled in crowded communities and developed civilized societies rich in craftsmanship, learning, and art.

For Europe and America other reasons must be found,

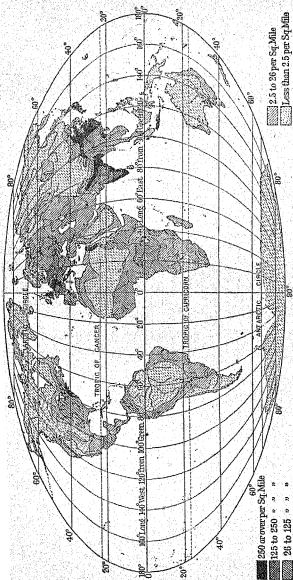


FIG. 15. DENSITY OF POPULATION

From "Modern Business Geography," by Ellsworth Huntington and Samuel W. Cushing (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

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for here the yield of the soil is less certain, and climatic conditions demand effort and foresight from the inhabitants if they are to escape want in winter. Some of the reasons occur readily to one's mind. Undoubtedly *coal* and *facilities of transport* must be placed first. Following the invention of the steam-engine and its application to textile machines, there has grown up all that intricate structure of commerce which, beginning in the British Isles, has spread wherever the white races have found coal. Closely allied with it is wealth of metallic ores, so close in fact that the supply of iron ore, for instance, has so much aided the mining of coal that it is difficult to say which helped most, the coal in the iron industry or the iron in the coal industry. *Water-power* was used in the early days of the Industrial Revolution, before coal became so widely used. But researches in electricity have enabled the white races not only to utilize water-power, both in regions where coal is wanting and those where it is found, but even to arrange for coal to be superseded as fuel in the ordinary way, and more and more to be utilized to produce electric power and such by-products as benzole for internal-combustion engines. This revolution in industry is having very far-reaching results. Indications of what is happening can be seen in our country, where factories of all kinds are being erected in the South of England far from coalfields. It is more noticeable still in countries like Switzerland, Norway, Italy, and Canada, which are blessed with great resources in water-power. These countries, made thus more independent of coal, which formerly had to be imported for manufacturing purposes, are able to develop industries otherwise impossible. This change must result in great modifications of the areas of dense populations. For electricity is daily improving not only conditions of industry, but also means of communication. One result of this is to create desires for new foods and other comforts of life among the rice-eating populations of the monsoon countries. It has been

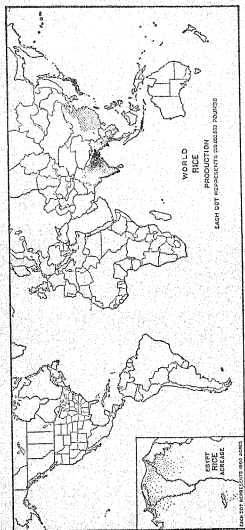


FIG. 16 THE WORLD RICE PRODUCTION

From "Modern Business Geography," by Ellsworth Huntington and Sumner W. Cushing (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

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aptly said that a change of diet of a large population is more important than a change of dynasty.

Among facilities for transport, *sea-ports* rank high. For with the spread of manufactures, every part of the world increasingly depends upon the rest of the world for the supply of manifold needs.

In the case of Europe the *shallow seas* covering the continental shelf have helped to establish a large population around their shores. For the high tides of these comparatively shallow waters enable vessels to get much farther toward the heart of the countries than would otherwise be the case. The abundance of fish in cool shallow seas has also encouraged settlement along their shores. Europe, too, has *extensive plains sloping to the sea*, which at the same time secure for it a mild climate and good waterways. Imagine ranges of mountains running parallel with the west coast of Europe as they do with the west coast of America, and it will be seen at once what a great asset it is for Europe to be open toward the Atlantic.

Man's Influence on Nature. Climate, mountains, forests, deserts, swamps, fertile soils, minerals, and sea-ports are, then, geographical factors which have controlled man's choice of home. But man has never been content to submit tamely to the dictates of Nature. With infinite inventiveness he is always striving to overcome them. It is worth while, even if only to spur us on to further effort, to recall some of his triumphs against the obstacles of Nature.

Where climatic conditions or insect pests like the mosquito formerly made life intolerable, medical science has enabled man to conquer disease, notably in West and Central Africa. In the case of the Panama Canal disease foiled all attempts to cut it until the cause was found and removed.

Mountain barriers have been pierced by tunnels and land routes further shortened by great bridges; for example, the Forth Bridge, the bridge at Montreal, the bridge to Key West in America, and many others. In the same

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way sea routes have been shortened by ship canals—Panama, Suez, Kiel, Caledonian, Corinth, and those connecting the Great Lakes of America.

Forests have in some cases been cleared, as in Europe, North America, and other parts. On the other hand, forests are being established by man in order to promote rainfall and to guard against the washing away of the soil covering of the rocks.

Deserts have been made fertile by irrigation, by utilizing the flood-waters of rivers like the Nile, sometimes by diverting the courses of rivers, even making water tunnels through mountains, by pumping on a large scale, and by boring artesian wells.

Marshes are constantly being drained; the sea driven back by dams, and coasts protected from its attack.

Fertility of soils is retained and increased by knowledge resulting from scientific research.

Minerals are made to provide man with ever-improving tools to aid him in his struggle. Natural sea-ports are continually being improved by walls and by dredging, and harbours have been created where needed.

The oceans are no longer a barrier but a highway, and travel is easy by railway and by air; communication is instantaneous by wireless and by cable; transport of perishable goods is made possible by refrigerators. Natural products like silk, nitrates, etc., are now supplemented by synthetic processes.

But it must not be forgotten that great as these triumphs of man over Nature are, Nature in most cases retaliates for the interference. Tunnels through mountains may reduce distances, but they are expensive to make and difficult to maintain. Diverted rivers often produce troubles in other parts of their courses. Some people think that destruction of forests has a climatic effect, producing barren wastes; and man's interference with the balance of nature in the animal world sometimes produces harmful results, as, for instance, in the case of rabbits introduced into Australia.

CHAPTER IV

THE WORLD TO-DAY

ONE result of the Great War is that the political map not only of Europe but of the world has been redrawn. The present map is the work of diplomatists and politicians. In the past they have notoriously neglected the important factors of geography and all those interests which are summed up in the word 'nationality.' But it is to their credit that on this occasion, under the leadership of American and British representatives, they aimed at a settlement which should ensure peace. And although there are many features of the new map which for geographical reasons seem unsatisfactory, the existence of the League of Nations gives real ground for hoping that when the time comes to make necessary changes a peaceful way of doing so will be found.

International Boundaries. Boundaries in the past have been drawn mainly with the idea of separating peoples and providing for defence against attack. In earlier times this was best secured by a kind of no man's land—a belt of waste ground—not a line. Many instances of *natural barriers*, like marshes, mountains, and rivers, can be found; for example, the Fen country, the Netherlands, the Welsh 'marches,' the lagoon site of Venice, and the Danube.

Nowadays every nation in the world is dependent for its needs on other nations. So that everywhere it is necessary to encourage friendly relations between peoples on each side of a boundary and easy traffic to and fro across it for trade purposes. At the same time, commercial prosperity depends very largely on a feeling of security, so that boundaries must be capable of defence.

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Even if war were eliminated, countries must still protect themselves from such things as animal and human diseases and from undesirable visitors and their trade against smuggling. *Seas* and *deserts* have hitherto offered the greatest security. The history of our own islands and late discovery of Central Africa illustrate this. But the sea is now a highway, and in war-time a source of danger, either from sudden attack or because supplies of food can be cut off. And deserts no longer shield from attack in this age of aircraft.

Mountains are often natural boundaries, because they cannot be permanently inhabited above a certain height, which varies with latitude, and because they are difficult to cross, are usually forested or snowclad, and often occur in parallel ranges covering hundreds of miles from one side to the other; for example, the Andes of South America, the Pyrenees, the Alps, the Appalachians, the Himalayas, and the mountains of Norway and Sweden.

If the mountain ranges are deeply cut by valleys leading to relatively easy passes the barrier effect is naturally reduced, and often both sides are occupied by the same nation. A wide mountain region enclosing plateaux or lowland basins is usually divided into separate political units occupied by hardy peoples, proud of their land, their dress, their customs, and ready at all times to defend themselves with vigour against attacks. The history of the Welsh, the Highlanders, the Swiss, the Montenegrins, and the Tibetans illustrates this.

Rivers, in the days before engineers could span them with great bridges, or drain their swampy banks, or harness their courses between walls or levees, were obvious barriers and boundaries. They are still boundaries in countless cases, but no longer serious barriers. They are useful as boundaries because, in their lower courses at any rate, they are easily identified and can be easily defended. At home the Thames, the Forth, and the Shannon are the best examples. In Europe, the Rhine

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has been a most important boundary from Roman times throughout modern history, and so has the Danube with its marshy banks.

But the more the nations of the world realize that their interests are united, the more rivers are used for intercourse rather than as barriers. The Rhine and the Danube have been made international rivers. Perhaps some day the Dutch and the Belgians will have a happier understanding about the Scheldt.

But they will always be convenient as boundaries in countries where defence of the river need not be considered, as in America, Australia, and Africa. Rivers like the Mississippi, Ohio, Rio Grande, Murray, and Congo form useful boundaries for states.

THE COUNTRIES OF EUROPE

The War resulted in the break-up of no fewer than four great states which previously dominated Central and Eastern Europe—viz., Germany, Austria, Russia, and Turkey. Whereas formerly Russia directly adjoined Germany, Austria, Norway, and Sweden, there are to-day a dozen independent states. *Poland*, with its purely artificial boundaries, occupies a vital part of the great northern plain, extending from Russia to North Germany. *Rumania* is no longer confined between the Transylvanian Alps and the Black Sea, but is seated astride the Transylvanian highlands, with one foot in the Danube basin and the other in that of the Pruth, with the Dniester as a boundary on the north and the Danube on the south. Rumania thus occupies the delta of the Danube and has access to the Black Sea. *Poland* has to be content for communication in the Baltic with a corridor leading to the free city of Danzig, and the new Polish port of Gdynia. Each state has been created out of territory formerly belonging to her powerful neighbours.

Russia's access to the Baltic has been restricted to

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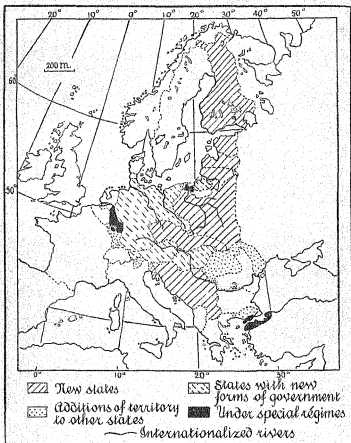


FIG. 17. TERRITORIAL CHANGES IN EUROPE FOLLOWING THE GREAT WAR (1914-18)

After Bowman

Leningrad and the adjoining coast by the creation of the four republics *Finland*, *Estonia*, *Latvia*, and *Lithuania*, each with important ports—Helsingfors (Helsinki), Reval

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(Tallinn), Riga, and Memel (Klaipeda). All these are unprotected by any natural frontier.

To the west of Poland and Rumania lie three inland states, *Austria*, *Czechoslovakia*, and *Hungary*. The first two occupy mountainous regions, Austria being confined to the eastern valleys of the Alps, while the Bohemian mountains and the Carpathians constitute the northern boundary of Czechoslovakia, and portions of the Danube its southern boundary. Hungary, on the other hand, is entirely confined to the plain of the Middle Danube, with the Danube separating it from Czechoslovakia and the Drave from Yugoslavia. The Balkan peninsula is shared by *Yugoslavia*, *Bulgaria*, *Albania*, *Greece*, and *Turkey*. Practically the whole region is mountainous, but the boundaries make little use of natural features. Each of these states has a coast-line giving access to the Adriatic, the Black Sea, or the Mediterranean.

Thus, in the same way as the Congress of Vienna in 1815 created the united kingdom of Holland and Belgium and the Confederation of Germany, and just as it strengthened Austria both in Germany and in Italy in order to restore a balance of power as a shield against further possible trouble from France, so in 1918 the Powers set up this series of new states to ensure against any attempt by Germany and Austria to regain their losses, and at the same time to protect western Europe against the menace of the Russian Revolution. But whereas in 1815 the Powers were thinking chiefly of the interests of the ruling families, and ignored those of the nations concerned, the Powers in 1918 have attempted to realize the hopes of certain nationalities. And in place of Metternich's alliance to provide military force to suppress unrest, we have the League of Nations to secure that, before military force is resorted to, every other means of settling disputes shall be tried.

Germany. We have seen that Austria was reduced to about the size of Scotland. What of Germany? East and

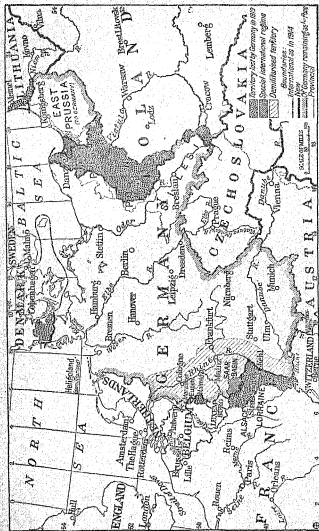


FIG. 18. CHANGES IN THE BOUNDARIES OF GERMANY AS A RESULT OF THE GREAT WAR
 From "The New World: Problems in Political Geography," by Isaac Rosenberg (The World Book Company, Yonkers-on-Hudson,
 and George G. Harrap & Co., Ltd., London)

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west, Germany lost 25,000 square miles of territory in Europe. On the east the most important area is that returned to Poland after 200 years. The remainder, consisting of East Prussia, is separated from the rest of Germany. On the west, Alsace and Lorraine, which, though smaller, are economically of vast importance, were returned to France. In addition there are smaller adjustments of boundaries in Belgium's favour, and for a period of fifteen years from the Peace Treaty of 1919 the Saar basin is being controlled by France.

The present republic consists of eighteen states, with local government in certain matters, but under the central authority. In 1815 there were thirty-nine states, and before the Napoleonic wars over three hundred, each virtually independent under the nominal headship of Austria. The nineteenth century saw the struggle between Prussia and Austria for leadership, ending in the triumph of Prussia, mainly through Bismarck's diplomacy. The most remarkable effect of union was the rapid development of Germany as an industrial, rather than agricultural, country. As a result, population increased rapidly after 1870, and manufactures flourished to such an extent that German trade became world-wide and Germany herself a serious competitor to Britain. The present republic is making great efforts to recover from the effects upon German trade of the Great War. But, in spite of this industrial activity, agriculture receives much attention, and Germany does not require imports of foodstuffs to the extent that Britain does.

France, therefore, has gained not only in area, but in becoming more compact, and is now the largest state in Europe west of Russia. But her population is no larger than our own. It is, however, much more evenly distributed. The boundaries of France lie along natural features, the sea in the north, west, and south, the Pyrenees in the south-west, and the Alps, the Jura, and the Rhine in the south-east. Only between the Rhine and

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the North Sea is the boundary artificial. Dangerous as this proved to be in war, the Franco-Belgian frontier, cutting as it does across a great coalfield, is more convenient in peace as a means of intercourse between the two peoples than a natural barrier would be.

Belgium, as we have seen, gained certain small territorial advantages—about 400 square miles—but though small

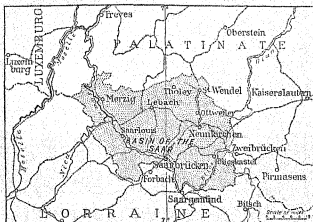


FIG. 19. THE SAAR BASIN

From "The New World: Problems in Political Geography," by Isaiah Bowman (World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

they strengthen her frontier. Belgium has suffered throughout European history from the fact that she is a corridor country occupying the lowland gateway, which avoids the Ardennes upland, between France and Germany. Known as 'the cock-pit of Europe,' Belgium has been a pawn in the game of empires. For 200 years she was under the rule of Spain, and then passed to the Austrian branch of the Hapsburg dynasty. During the French Revolution France seized control. In 1815 Belgium was united with Holland, but fifteen years later won her independence, and her independence as a neutral state was guaranteed by the

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Powers in 1839, only to be violated by Germany in 1914. Her chief port, Antwerp, is hampered by the fact that Holland controls both banks of the river for forty miles from its mouth. And Holland is naturally more concerned with the prosperity of Rotterdam than that of Antwerp.

Holland, too, has had a struggle for independence. The Dutch have won much of their land from the sea and much prestige and power upon it. Dutch colonial possessions are a reflex of this, being nearly seventy times the area of the homeland.

Italy vastly improved her north-east boundaries by the terms of the Peace Treaty. Austria no longer holds the Italian side of the Alps. Also by the attitude shown on the question of Fiume and the Dalmatian coast, Italy practically controls the Adriatic Sea. In actual territory she has gained about 9000 square miles, and the increase in population is nearly 2,000,000.

The other nations of western Europe have retained unaltered their pre-War boundaries.

Spain and Portugal occupy the third southern peninsula of Europe. Spain is a thinly populated country of table-land type. Portugal lies along the western escarpment and the Atlantic coastal plain. Only for the brief period from 1580 to 1640 were they united. Their interests and outlook are different. The Portuguese were the pioneers of geographical discovery. Their interests lay on the African coasts, along the routes to India, and across the Atlantic in Brazil. In Africa Angola, Mozambique, and other small areas still remain Portuguese possessions, and although the Portuguese Empire has declined, her long-standing friendship for Britain is evidence of her interests across the oceans. This friendship, and the danger to Portuguese colonies from Germany, accounts for the help Portugal gave us in the War.

Spain looks rather across the Mediterranean to North Africa. Carthaginians, Romans, and Moors have all left

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their mark on the country. Later, it is true, she rapidly extended her power over the New World, and to-day Spanish is still the chief language in Central and South America. But that power waned as rapidly as it rose, due to a mistaken view about colonies. Spain, like other countries, including our own, made the mistake of treating her colonies as a source of profit to the homeland. The War of American Independence taught us our mistake, but Spain clung disastrously to the old idea. Another reason for the decline of Spain is the difficulty of securing unity in a country broken as Spain is by natural barriers. In contrast to Portugal, Spain, remained neutral in the Great War.

Switzerland, another inland mountainous state—no longer the only one without sea coast—has achieved unity despite the difficulties caused by mountains. Always jealously guarding their independence, the Swiss are, however, compelled by geographical position to consider their powerful neighbours. This factor has welded together a people diverse in language, customs, and religion. Controlling the important Alpine routes, the Swiss Government uses this position to secure valuable privileges of transport to the sea, which otherwise would be denied her.

To the north-west of Europe lies a group of three states, Denmark, Sweden, and Norway, peopled by races speaking similar languages and with similar religious views. Like Holland and Switzerland, they were neutral states in the War, and, like all the neutral states, to some extent prospered. Norway, like Portugal, looks out across the Atlantic, while Sweden and Denmark, like Spain, are chiefly concerned with a landlocked sea.

Similarly, Norway and Sweden, like Portugal and Spain, have found geographical facts opposed to union. Norway originally belonged to Denmark, but in 1814 was taken away and united with Sweden. This union lasted longer than that of Belgium and Holland, and was broken only ten years before the Great War. Now that the danger

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to Sweden from Russia is reduced by the establishment of Finland, and danger to Denmark from Germany removed, each of these countries can look to its own future. Their future, like the past, is bound up with freedom of the seas. How important the sea is to them is seen in the fact that the three great ports of Oslo, Göteborg, and Copenhagen contain over a million of the total population of less than thirteen millions in the three countries.

Overseas Possessions. So far we have considered the countries of Europe lying west of Russia. Each one of them has, or had, interests across the sea, some small in extent, some vast. In some cases they directly control vast populations of other races, in others their influence is only what remains of historical relationship. The United States, Mexico, and Brazil, once colonies, are now independent states. Russia, on the other hand, and most of the Asiatic countries are self-contained, with no detached dependencies.

North and South America, Africa,¹ and Australia are entirely parcelled out into states, at one time or other under European control. In many cases the children have outgrown their parents. And these sturdy offspring are growing more and more to regard Europe as some children regard their parents—to give them some respect on account of age and relationship, but to pay much less attention than formerly to quarrels in the family of Europe, and to concentrate on carving out their own careers. If the countries of Europe understood better this attitude of other countries toward European affairs it might lead to more co-operation and sympathy between parental Europe and the younger countries, which should make for the happiness and prosperity of all.

The Peace Treaty handed over Germany's overseas possessions to one or other of the Allied countries, Britain (and the Dominions), France, Belgium, Italy,

¹ There are a few small exceptions in Africa—*e.g.*, Abyssinia and Liberia.

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Portugal, and Japan. But it must be remembered that these countries govern the new territories as representatives of the League of Nations. They have to be governed in the interests of the inhabitants, and not for selfish gain. The countries which have 'mandates' have to report to the League of Nations on the progress of the territory in question, and the rights of other states have to be considered. In governing a country joint control has in the past proved a failure in such cases as Egypt and Tangier. The new plan avoids this by placing control in the hands of one Power, so that there is no excuse for delay or confusion caused by negotiation. Yet, on the other hand, the way in which the mandatory Power discharges its duties is subject to supervision and, if necessary, correction by the League.

But the fact that they have been assigned in most cases to the Power which held adjoining territory has resulted in large areas coming under one control.

THE COUNTRIES OF AFRICA

Africa is almost entirely controlled by Europeans, Liberia and Abyssinia being the only independent countries in the continent. The Mediterranean coastal area and the Nile valley were well known to the early civilizations, and the other coasts were explored centuries ago. But the interior remained almost unknown till the last century. For centuries the aim of European nations was to find a way round Africa. It was simply a stepping-stone to the East. When at last interest was directed to Africa itself explorers found many difficulties in their path. Across the north stretched the great Sahara, more dangerous than the oceans. From the sea access was equally difficult. The interior rises steeply from the coastal plain. The rivers were useless as highways, for since the continent is largely plateau the rivers descend to the sea in a long series of rapids

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and falls. The vast equatorial forest seemed an impenetrable barrier. To that were added the difficulties of a tropical climate, animal and insect dangers to life and health, and a large population of vigorous native races. The negro races never desired to conquer other lands outside Africa, but they dreaded the coming of the unknown white man, and resisted fiercely. It must be remembered that the first white men in many parts were slave-traders. The journeys of Livingstone, Stanley, and others in the nineteenth century were the first real attempts to penetrate the interior in quest of knowledge. By this time the industrial changes following the invention of steam-engines and other machines had spread over Europe. European nations awoke to the value of territory for commercial purposes. There followed the scramble for Africa. Trading companies took possession of what they could, others obtained 'concessions' from one or other of the Powers. In 1879 Britain and France took over control of Egypt, and in 1884 it was necessary to hold a conference in Berlin to settle the relations of European Powers in Africa. In 1885 the King of the Belgians declared himself ruler of the whole Congo region. In South Africa the British had taken the Dutch settlements in 1806 and retained them by treaty in 1815, and by the end of the century they occupied a considerable area. Between 1890 and 1914 Britain came to terms with Germany (1890), Portugal (1891), and France (1898-9) regarding African possessions. Since the War, however, Germany's colonies have been allocated elsewhere, as already stated.

The Present Partition. The political map shows that by far the greater portion of Africa forms part of two great empires—the British and the French. The French Empire in Africa is a large, compact area occupying the whole of the west except for four British colonies, one Portuguese, and one Spanish, and one native free state cut out of it along the coast. Its size on the map—3000 miles from

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north to south, and 3000 miles from east to west—is, however, deceptive, for a large part is desert. The population of this large area does not greatly exceed that of the smaller British areas enclosed by it. All French territories are dependent upon French home Government. There are no self-governing colonies like Canada or Australia. Algeria is treated as though it were part of France. This illustrates the advantage to France of having her Empire near at hand. It is not only compact but easily accessible. Along the Mediterranean coast adjoining Algeria, lie Morocco and Tunis. But Morocco really faces the Atlantic, being similarly placed with respect to the Mediterranean as Portugal. Morocco, therefore, is not a Mediterranean country. Tangier is under international control. Round Tangier lies a zone south of the Strait of Gibraltar administered by Spain. In 1911 Germany tried to check the power of France and to get a footing in Morocco by sending a gunboat to Agadir. But the Powers were firm, and prevented war. The French manage their difficult task well, for they have to control a race of Arabs who hate European control. Across the Sahara to the south lie French West Africa, French Guinea, the Ivory Coast, Dahomey, and French Equatorial Africa. Germany's former possessions, Togoland and the Cameroons, are now mandatory territories under the control, partly of Britain and partly of France.

The other French possessions associated with Africa are the islands of Madagascar and Reunion. The island of Mauritius, first Dutch, then French, became British in 1810. The importance of these islands lay in their positions on the route to India and the East.

The British Empire in Africa occupies chiefly the east of the continent. Egypt is now independent, but British influence is strong. From the Sudan, where British influence is established, through Uganda, Kenya, and the mandatory state of Tanganyika Territory, British territory forms a continuous belt from the Mediterranean to the

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Cape. In the south are Northern and Southern Rhodesia, and the Union of South Africa. To the south-west lies another of Germany's former colonies, now a mandated territory under the Union of South Africa. Detached from the rest is British Somaliland. This great belt of country, evenly balanced about the equator, is a highland region, mostly over 3000 feet, and much of it over 5000 feet. Fortunately, for reasons of climate and health, some of the highest parts are near the equator. Between these altitudes white men can live without harmful results to health. In this respect it has a great advantage over West Africa. Further, there is no great desert to separate north from south, as the Sahara does in French Africa. On the other hand, we shall see that it is a belt exceedingly rich in natural productions, both vegetable and mineral. Much has been written about the Cape to Cairo railway which was to link the two gateways to the East, the Suez Canal and the Cape. Some 2000 miles have been constructed from Cape Town nearly to Lake Tanganyika, together with many branch lines to the coast. From the north, the Egyptian railway extends from Alexandria to Aswan and from Wadi Halfa to Sennar beyond Khartum and then to El Obeid. But as a transcontinental railway it still remains a project. It should be noted that British territory reaches the Indian Ocean only in two places, between lat. 0° and 10° S. and south of lat. 25° S. In West Africa lie the scattered British colonies of Nigeria, the Gold Coast, Sierra Leone, and Gambia. Sierra Leone used to be known as 'the white man's grave.' The advance in medical knowledge has removed this reproach, but the climatic conditions are still difficult for white settlers. But these colonies are rich in the production of raw materials, particularly palm oil and cacao, and they lie nearest to Britain, within 3000 miles. With an abundance of shipping facilities, therefore, Britain has most of the trade of the coast.

In the same way that French West Africa is cut into

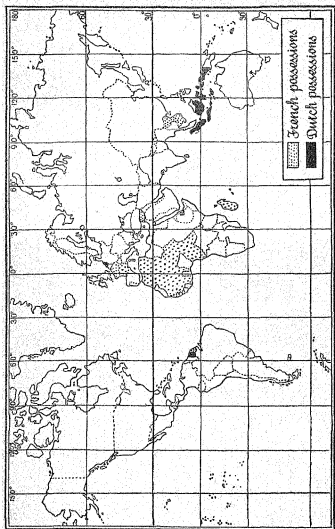


FIG. 20. FRENCH AND DUTCH COLONIES
After Boerwar

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by British and other colonies, so British territory is cut into in East Africa by the Portuguese possession of Mozambique, and farther north by Italian Somaliland, French Somaliland (facing Aden), Eritrea, and independent Abyssinia.

Portuguese Africa. *Portugal* occupies, besides Mozambique, the large state of Angola on the west coast south of the equator, and Guinea north of it. In addition, the west coast Cape Verde Islands belong to Portugal, together with the islands of São Thomé and Príncipe in the Gulf of Guinea.

Italian Africa. *Italy* has gained territory at Britain's expense in Libya and in East Africa, where part of Kenya Colony west of the Juba river has been added to Somaliland. The three colonies of Libya, Eritrea, and Somaliland are widely separated, and suffer from a dry climate and poverty of productions. Italy had hopes of acquiring Abyssinia, but suffered a severe defeat in 1896 at the battle of Adowa.

Belgian Africa. The only remaining country to mention is the Belgian Congo. This vast area of nearly a million square miles has enormous possibilities. A corner of German East Africa (some 18,000 square miles) has been added to the Belgian Congo as a mandatory territory. The whole region is densely forested, and therefore thinly populated; but the abundance of natural products, notably rubber, palm oil, and copper, helped by transport facilities afforded by numerous rivers and supplemented by railways, makes this colony an increasing source of wealth to Belgium.

THE COUNTRIES OF AMERICA

We have seen how Africa is linked to Europe by a multitude of interests. The Americas are also linked to Europe, but in a different sense. Colonized by Europeans, these continents to-day are occupied almost entirely

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by independent states. Canada, we know, is a British Dominion. But British Dominions enjoy all the advantages of independence combined with the immense gain in security, trade, and culture obtained by belonging to a world-wide federation of British peoples. For the rest, excepting the small British colonies of Honduras, the West Indies, and the Guianas of South America, all the countries are free states. Free, yet dependent for trade, capital, and shipping, upon Europe on the one hand as well as upon the United States on the other.

North America is divided between the two English-speaking countries of Canada and the United States and the Spanish-speaking republic of Mexico. Canada, at one time French, still uses French in addition to English in the eastern provinces. In that respect Canada is like South Africa, where Dutch is widely used, but, unlike South Africa, there is no black race to complicate the problems of government. In the United States, however, an immense black population, inherited from the days of the slave-trade, plays a very important part in politics.

How much America looks toward Europe can be seen by a study of maps showing the distribution of population, railways, industries, and crops. The meridian of 100° W. proves in this respect a remarkable dividing line, showing the close relationship between America and Europe.

Thus the physical features, the population (alike as regards race, language, and density), and the industries of eastern America and western Europe are similar in character. The two are linked by every means of communication—cables, and fleets of ships, including the largest and fastest lines. Conversation by wireless telephone is now possible between Britain and the whole continent of North America. New York lies 4° south and London 6° north of latitude 45° N., the half-way line. Both continents are penetrated by great waterways—the St Lawrence and the Great Lakes on the one hand and the Baltic on the other. As inland centres of great

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importance, Chicago may be compared with Berlin. Paris lies in relation to London much as Boston or Philadelphia does to New York.

The United States, by the Monroe doctrine, will not permit European interference in American affairs. But while Latin America welcomes this so far as it secures national independence, the ties of culture and sentiment are much closer with the nations of Western Europe than with the United States. In 1898, as a result of war with Spain, the United States took possession of the Philippine Islands across the great Pacific, and also the islands of Porto Rico and Cuba in home waters. Cuba was granted independence, and is now a republic under American supervision. In addition, the construction of the Panama Canal provides not only a short sea route between the east and west coasts, but gives the United States control of a great world gateway. The canal zone, ten miles wide, is American, and the state of Panama is under American protection. In the same way the United States supervise Haiti, Santo Domingo, and Nicaragua.

The United States. The boundaries of the United States are of particular interest. The Rio Grande river, which forms the larger part of the southern boundary, is a good example of the advantages and disadvantages of a river boundary. While it appears to be clearly defined, it has a changeable course, and is also easily fordable, and therefore useless as a protective frontier. The natural barrier consists of the wide tract of semi-desert which almost isolates the Mexicans living along the riverside from their fellow-countrymen in the south. Special trade concessions had at one time to be made for this area, to prevent it becoming depopulated by Mexicans migrating to the American side. Thus the two banks are much more united than they are divided by the river boundary.

The republic of Mexico, being particularly rich in minerals, has always been important to European nations. For three hundred years Spain ruled Mexico and took its

THE IMPORTANCE OF 100° W. LONGITUDE IN NORTH AMERICA¹

WEST OF 100° W.

EAST OF 100° W.

- | | |
|--|--|
| (1) <i>Area:</i>
The meridian roughly bisects the continent. | |
| (2) <i>Altitude:</i>
Average height over 2000 feet. | Mainly under 2000 feet. |
| (3) <i>Rainfall:</i>
Under 20 inches. Much of it under 8 inches. | From 20 to 80 inches. |
| (4) <i>Temperature:</i>
The coldest part of the United States in winter—viz., Montana—and the hottest region in summer—viz., Arizona. | The continental climate lessened by the influence of (a) the Atlantic Ocean; (b) the Gulf of Mexico; (c) the Great Lakes. |
| (5) <i>Vegetation:</i>
Region of great plains. Little agriculture without irrigation. Too cold in winter, too dry in summer for trees and crops. Therefore grasslands. Only mountain slopes forested. | Region of prairies. The climate less extreme, with sufficient rains. Therefore crops on fertile prairies in forest clearances. Deciduous forests and lumber regions south of the Missouri and east of the Mississippi. |
| (6) <i>Animals:</i>
Sheep on the higher western plains. Cattle and horses farther east. | Cattle and hogs. |
| (7) <i>Minerals:</i>
The chief source of gold, silver, copper, and zinc. | Largest fields of coal, petroleum, natural gas, and iron. |
| (8) <i>Population:</i>
Large areas less than 20 persons per square mile. | Over 50 persons per square mile; a large area with over 100; and along the New England coast 200 to 500. The centre of population lies near Indianapolis, 86° W. |
| (9) <i>Political divisions:</i>
Large states, boundaries chiefly artificial. | The states get smaller as one goes eastward, and many have river boundaries. |
| (10) <i>Railways:</i>
Practically only transcontinental routes, with short branch lines. | A very close network. |

¹ The Pacific coastal region west of the Sierra Nevada mountains is excluded for the purpose of this comparison.

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silver and gold. Since it has become a republic other nations have spent vast sums in Mexico, developing its mines and other resources. But the inhabitants, composed of native 'Indians,' Spaniards, and those of mixed European descent called 'Mexicans,' suffer from very unsettled government. The United States has more than once intervened in the interest of order.

Similarly, in the other states of Central America, Guatemala, Salvador, and Honduras, the United States has frequently endeavoured to guide their affairs to secure peace and to promote prosperity. For the peoples of these states have not yet learned to manage their own affairs peaceably. Naturally much of the trade of these countries is to and from the United States, just as Canada has developed a growing trade with the West Indies.

Canada. The northern boundary of the United States is a striking political frontier. For over a hundred years this 5000-mile boundary has been left unguarded on either side. West of the Great Lakes it follows the purely artificial line of the forty-ninth parallel. It passes through Lakes Superior, Huron, Erie, and Ontario, and only when it nears the Atlantic coast does it in any way follow natural features. Americans and Canadians pass to and fro with the greatest ease and the smallest formalities of passport. Canada is the best customer of the United States. Three-quarters of Canadian imports come from the United States; vast sums are invested there by Canadians and by Americans in Canada. Just as geographically both sides of the frontier are similar along its length, so the inhabitants share similar views. Strong though this relationship is, there is no thought of conquest, or even of absorption. For to Canadians Britain is still the homeland, and to Americans Canada is like a close relation.

Notice also that Canada has an American frontier to the north-west as well as on the south. Alaska was the first gain the United States made of territory lying outside its own area. Bought from Russia in 1867, there followed a

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dispute between Britain and the United States as to the meaning of a phrase in the treaty, 'parallel to the coast.' As the result of arbitration, America was given the long strip of coast on the west of Canada. For the rest, the boundary is a purely artificial one—viz., the meridian of 141° W. The region is thinly populated, and although it has been profitable on account of seal-fisheries, the Yukon goldfield, and the forests on the Pacific slopes of the mountains, no further dispute is likely to arise between Canada and the United States concerning this boundary.

In the continent of South America we find no fewer than ten independent states, and Guiana, which is partitioned between Britain, France, and Holland. In addition, we must include the adjacent British possessions of the Falkland Islands and South Georgia, and the Galápagos Islands, which belong to Ecuador.

Around the Caribbean Sea and the Gulf of Mexico lie the West Indian islands, forming a great arc. Porto Rico and the greater part of the Virgin Islands, as we have seen, belong to America, and Cuba and Haiti are republics under American protection. Outside this arc lie the British Bahamas; inside there is Jamaica, and in line with it are the Leeward and Windward Islands, mostly British, and Trinidad. The French have Guadeloupe, Martinique, and smaller dependent islands. The Dutch have Curaçao and adjacent islands off the Venezuelan coast.

The largest countries of South America are Brazil and Argentina. In 1494 a treaty between Spain and Portugal divided the New World between them by a line 370 leagues west of the Cape Verde Islands, which is approximately 40° – 45° west of Greenwich. Brazil, discovered in 1500, thus fell to Portugal, while the estuary of the Rio de la Plata, discovered a little later, fell to Spain.

When Portugal was annexed by Spain between 1580 and 1640, Brazil was seized by Spain, and as a result was attacked by Protestant Holland. When Portugal recovered her independence she had to struggle against the

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Dutch and the French for Brazil. Early in the nineteenth century Brazil became virtually independent, and the present republic was proclaimed in 1889. Spanish America took advantage of the Napoleonic wars to secure freedom, and their independence was recognized by Canning in 1823, when he "called in the New World to redress the balance of the Old."

Thus developed the countries of to-day, the republics of Brazil, Argentina, Bolivia, Peru, Colombia, Venezuela, Chile, Paraguay, Ecuador, and Uruguay, in order of size. The arrangement of these countries is closely connected with the physical character of the continent. Like its northern neighbour, South America has a great mountainous belt shutting it off as by a wall from the Pacific. The bulk of the continent by nature looks out over the Atlantic to Europe and to Africa. The great basins of the Amazon and the Plata constitute the two largest states, with Paraguay, Uruguay, and part of Bolivia as buffer states between them. Along the mountainous Pacific coast four states sit astride the Andes, and a fifth, Chile, lies along their western flank; while in the north Venezuela occupies the basin of the Orinoco and the Guianas share the Atlantic slopes of the highlands of that name.

In the light of such a history it is natural that Spanish and Portuguese should be the predominating languages. Taken as a whole, the population is much less concentrated than in North America. Apart from the great cities of Buenos Aires and Rio de Janeiro, with over 1,000,000 inhabitants, and smaller ports, like Valparaiso, Lima, São Paulo, and Bahia, with less than 500,000, the population of some 65,000,000 is widely spread. This is due to the fact that the continent produces chiefly raw materials, not manufactures. Rubber, coffee, wool, hides, nitrates, and foodstuffs are sold in exchange for the products of manufacturing countries, such as textile goods, locomotives, farming and any other machinery. Most of this trade is with western Europe. The United

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States takes only about a quarter. The most important economic area is that which comprises Southern Brazil, Uruguay, and Argentina. Here the people are more numerous and more energetic than in the equatorial north. And this area is actually nearer European ports than it is to the ports of industrial United States. By language and association the needs of South American countries are better understood in Europe, for there are millions of European immigrants in South America. It is true that the Panama Canal gives the United States improved communication with the states of the Pacific coast, but the trade of these states forms only a quarter of the trade of the rest. More British capital is invested in South America than that of any other country. Most of the railways were laid down by our engineers, and British companies have vast interests in Colombia, Peru, and Chile. The control which the United States exerts over Central America has led to misunderstanding with several of the Latin states of South America. Colombia was offended when the United States took over Panama, and Chile has not forgotten that the United States helped Peru in the war of 1880. But the United States is making great and successful efforts to overcome these difficulties and to compete with European trade.

Many boundary difficulties have arisen owing to agreements made before the country was properly known and surveyed. Phrases like the crest of a mountain chain or a watershed look clear enough in a treaty, but are difficult to define on the spot. Again, where boundaries seemed to require no particular detail, as when they pass through unpopulated or virgin forests or grassland, the question becomes acute when those deserts are found to contain valuable nitrates, the forests rubber, and the grasslands become valuable for cattle ranches.

The desert area between Peru, Bolivia, and Chile, the forest regions between Colombia, Ecuador, and Peru, the grassland between Bolivia and Paraguay, are instances of

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this. In disputes of this kind war is no solution, and many of the states have had the good sense to have their claims settled by international arbitration. In this respect the existence of the League of Nations should prove a boon to the nations of South America.

THE COUNTRIES OF ASIA

We have seen how the continents bordering the Atlantic are interdependent in a variety of ways. It remains to consider the great land masses of Asia, Australia, and New Zealand.

A line joining the eastern extremity of the Baltic with the western extremity of the Black Sea gives approximately the western boundary of Russia. East of this line, extending some 7000 miles to the Pacific coast, is the great country of Russia. And we must not forget that Alaska was at one time Russian. Larger than the whole North American continent, Russia contains approximately one-sixth of the land of the world. Russia (European and Asiatic) is four times the size of the rest of Europe. How is it that this immense, compact country came under one rule? The physical map supplies part of the answer in that it shows an almost continuous plain. Natural barriers are few, and those few are not formidable, so that it is a land where movement is easy and in many parts imperative, to maintain life. The history of Russia shows that down to the seventeenth century waves of population ebbed and flowed across the plain, merging into each other, until by intermixture the peoples became welded into a nation of Slav characteristics, and something like settled conditions prevailed. Among peoples who lead a wandering life the head of the family or tribe has supreme authority, and the bulk of the people have little desire and less opportunity for learning. Obedience to authority is recognized as essential to the welfare of all. Hardship is accepted as Fate: whatever work has to be done must

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be done; man must accommodate himself to circumstances. Gradually, therefore, the whole population became governed by a comparatively few aristocratic families, with the Tsar as Emperor. The title was first taken by Ivan the Terrible in the sixteenth century, who made Moscow his capital, replacing the earlier centres of Novgorod and Kiev.

The outstanding need of such an agricultural country is access to markets. And the history of Russia is the history of attempts to reach unfrozen seas. Peter the Great in the seventeenth century established Petrograd as an outlet in the Baltic. He reached southward to the Sea of Azov, with hopes of Constantinople. This development brought Russia into contact with Turkey, and raised British hostility, as it threatened the Mediterranean. Meanwhile Russian power had been pushing eastward. By 1650 the Yenisei and Lake Baikal had been reached, and soon after the Bering Strait was reached. Then slowly Russia extended her power on the Pacific coast. In the middle of the nineteenth century the Amur region was taken. Within recent times Russia reached Vladivostok, and later Port Arthur, but from the latter was ousted by Japan. Other attempts had been made to get through to the Persian Gulf and to India, but both were frustrated by Britain.

Although the Tsars from time to time tried to improve the conditions under which the people lived, the powerful interest of the land-owning families proved, unfortunately, too strong. So that the conditions of the peasantry remained wretched. When the Great War broke out these peasants were forced to leave the land and to fight for a cause they little understood, against Germans and Austrians with whom they had no quarrel. Realizing at last the selfishness of their rulers, they seized the opportunity for revolution, and the empire came to an end. Speedily the outlying regions in Europe broke away and secured independence, as shown in the revival of Poland, to

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which German and Austrian territories were subsequently added, the independence of Finland, and the formation of the other Baltic states. Other parts, like the valuable region of the Ukraine, have been retained only with difficulty. The communistic ideas of the Soviet Government suits the town populations, but not the peasantry. The towns can no longer supply sufficient goods in exchange for food, as the other western nations, owing to the insecurity of credit, are disinclined to trade. The Soviet Government is therefore making a great effort to develop manufacturing industries. The industries of the towns are hindered for want of material and leadership; and transport has become more and more inefficient. As the difficulties of central government increase, control of distant regions becomes more difficult, with the result that separate groups of provinces tend to form; for example, the Ukraine, the Cossack country of the Don Valley, the Crimea, and Transcaucasia.

Russia, then, remains an unknown quantity. But a population of nearly 200,000,000 cannot be ignored. With settled government the great resources of cereals, forests, minerals, and animals will find their markets, manufacturing industries will revive, and communications will be improved.

South of Russia lies the great belt of Asiatic deserts and plateaux which separate the other countries of Asia, much as the Sahara does in Africa. Shut in by this great barrier is China, accessible with ease only by the gateway of Manchuria or from the sea. Including Tibet, Manchuria, and Mongolia, as well as China proper, all the area that used to be the Chinese Empire is as large as the whole of Europe and larger than the United States. It has been, since 1912, a republic, with a population of some three hundred to four hundred millions.

The Chinese are a peace-loving people, and have always dreaded the 'foreign devil.' But no nation in the world to-day can shut itself off from the other nations. Although

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China has been highly civilized for 5000 years, poor communications and isolation for many centuries prevented that civilization from bearing full fruit. In the nineteenth century European nations, under one pretext or another, compelled China to grant them concessions of land and rights. Britain has Hong-Kong; the Kiao-chow peninsula was German, then for a time Japanese; and Russia had the Liaotung peninsula, which, together with Korea and Formosa, is now Japanese. In addition, there were a number of Treaty ports in which European nations had special rights. Britain had concessions at Amoy, Canton, Hankow, Tientsin, and Shanghai; Japan at Amoy, Foochow, Hankow, Newchwang, and Tientsin; and France at Canton, Hankow, Shanghai, and Tientsin. Since the revolution and civil war most of these Treaty ports have been given up.

It was the great mineral wealth, the coal and iron in great quantity and of high quality, and also the tin and other deposits, that attracted European nations. Then, too, so large a population is a vast potential market. And as this population is chiefly concentrated near the coast or along the great river valleys communication is easy, although railways and roads were few until recently. The struggle that is going on for control between the North and South of China has resulted in great interference with trade and in the revival of local rivalries. In so large a country the interests of different parts are widely separated, and it will be long before China becomes a united nation.

In the meantime Japan's attitude to China is perhaps more important than the attitude of European nations. The latter have undertaken not to demand further privileges. But Japan not only has Korea and the Liaotung peninsula for an indefinite period, but considerable interests in Manchuria, in the north. No country in the world has effected with such rapidity so great a change in its national life as Japan has done within the last sixty years.

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Portuguese, Dutch, and British missionaries and traders had been admitted to Japan as far back as the sixteenth and seventeenth centuries. But their stay was short-lived, and by 1790 Japan's only dealings with the western countries was confined to one ship a year. The national life was based on a type of feudalism, with a government in which the Shogun, the chief military commander, and the *samurai* (the warrior class) were more powerful than the Mikado. In 1853, however, the American government sent Commodore Perry to obtain protection for American sailors, and permission for American ships to call for food and supplies. Conventions with Britain, France, Russia, and Portugal soon followed. In 1867-68 the Mikado Mutsuhito proved himself one of the world's greatest men by introducing Western ideas not only into every branch of the government, but also in education and industry, as well as in the army and navy. The effect was amazing. The first railway was commenced two years later, and now there are over 12,000 miles of railway in Japan. In 1875 Japan obtained the Kurile Islands from Russia. In the next year she seized the Liu-kiu Islands, and in 1895 Formosa. Japanese trade rapidly extended not only to China and Southern Asia, but to Australia and New Zealand. War with China in 1894 gained territory on the mainland. Western nations, however, particularly Russia, compelled Japan to withdraw, on the plea that China was threatened. But within two or three years Germany had compelled China to hand over Kiao-chow. Russia got Port Arthur, Britain Wei-hai-wei, and the Treaty ports were opened. In 1902 Britain and Japan made an alliance. Strengthened by this alliance, Japan won back Port Arthur and the southern half of Sakhalin by the war with Russia. Japan is recognized by the other Powers as having special interests in China. Kiao-chow and Wei-hai-wei have now been returned to China.

Japan has sometimes been represented as comparable

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in position, size, and relationship to Asia as Britain is to Europe. But this is misleading. Japan is very mountainous, volcanic, and subject to violent earthquakes. It has a much more extreme climate than Britain, for Japan has a great continent on the west instead of a great ocean, as in the case of Britain. Only one-seventh of the land can be cultivated, as against five-sixths of Britain, and yet the population numbers 65,000,000, as against 49,000,000. Britain has a great Empire; Japan's overseas possessions are important, but relatively few. Britain has learned the art of training colonies in self-government; Japan is so recent a pupil, though a very apt one, that her abilities in this direction have not been tested, and at present she uses repressive measures. Between the two, moreover, is America, vitally concerned with the policies of both, and disposed to take as much interest in China as in Europe.

Asia, like Europe, has three great peninsular countries on the south—Malay, India, and Arabia. Of the Malay Peninsula the western portion and the southern end is British, the eastern is French, and the independent kingdom of Siam occupies the core. This peninsula, together with the whole archipelago of the East Indies, is a great meeting-ground of colonial interests. Here, in the Philippine Islands, America has Japan as next-door neighbour both on the north and in the east, where Japan has the former German Caroline and Marianne Islands under mandate. The Dutch in Borneo, Java, Sumatra, Celebes, New Guinea, and adjacent islands are in contact with the British in Sarawak, Brunei, and North Borneo. On the peninsula there are under British rule Burma, the Federated Malay States, and the Straits Settlements (Penang, Malacca, Singapore, and several small islands). France has Indo-China and some islands in the Pacific.

The focus of the whole region is Singapore, guarding as it does the gateway between the Indian Ocean and the Far East. Both as a receiving station for the tropical

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products on the one hand, and for manufactured goods on the other, and as a naval station its importance is very great.

No part of the British Empire is more important than India, for it is an empire in itself. In size it equals the whole of Europe, excluding Russia. If the Himalayas were placed in the Mediterranean they would fill it from end to end. Its population of 350,000,000 nearly equals the population of the whole of Europe. Yet in one way or another it is almost entirely under British rule. The only exceptions are five French settlements (Pondicherry, Karikal, Chandernagore, Mahé, and Yanam) and three Portuguese settlements (Goa, Daman, and Diu), all quite small. There are also some hundreds of states which comprise two-fifths of the area and include one-fifth of the population of India, with native rulers; but they all recognize the King as Emperor and his representative the Viceroy. The largest of these feudatory states is Hyderabad.

We did not conquer this empire, and it is not retained by military force. Britain went there to trade, and remains there to keep the peace and prevent civil war. In the first instance we turned to India as the next best thing after the Dutch had forestalled us in the East Indies in the spice-trade. Even in India the Portuguese and the French were before us. The latter proved the more difficult rival, and was displaced in the eighteenth century only after a long struggle. As every one knows, it was 'John Company' who managed India for Britain until the Mutiny, in 1857, when the home Government took over full control.

India has been conquered many times. In early times Alexander reached the Indus, and there were successive Hindu empires. Hinduism is still the chief religion. In the thirteenth and fourteenth centuries came Mohammedan invaders, producing an effect similar to that of the Protestant plantations in Ireland. When this empire

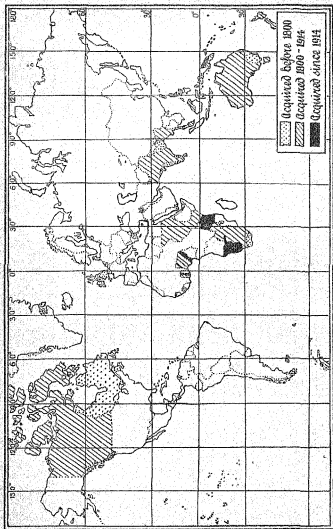


FIG. 21. GROWTH OF THE BRITISH EMPIRE

After Dawson

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declined, there came the Afghans and the establishment of the Mogul Empire. These invaders all entered by the north-west passes, and all have become absorbed into the Indian races. The British came by sea, not to conquer, but to make treaties to secure peaceful trade.

The explanation of the decline of the successive empires and of the duration of British rule is based on the same fact. The peoples of India are peasant peoples. They live in half a million villages. There are many large towns in India, but they contain only a tenth of the population. Peasant peoples desire only to be left alone to cultivate their land in peace and to enjoy their harvest in security. Conquerors can overcome armies and cities, but in such a land no government will succeed that does not secure the interests of the agricultural population. The people are not warlike, yet they dominate the policy of the whole country. At the same time they are so divided—by a hundred and seventy languages and dialects, by some two hundred castes, by several religions, and by the extent of the country—that some unifying influence is necessary. This is the secret of British control. By strict justice, by improvements, such as roads, railways, and all forms of communication, by irrigation, by relief of famine, the British Raj has secured the confidence of the great mass of Indian peoples.

There is a growing demand for Home Rule, but Nationalist leaders in India seem to think not of India as a whole in their demands. Each group appears to have chiefly in mind one region or one religion or caste for which authority is desired. The British Empire contains many examples of self-government, and by stages, no doubt, the government of India will be adapted to meet the desire for representation of each interest without endangering the peace of the whole. Steps in this direction have already been taken.

On the north-east of India is Tibet—a desert land of high plateaux, with many of the characteristics of the

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frozen deserts. Nominally part of China, it is virtually independent. Its 2,000,000 inhabitants are, like all mountain peoples, jealous of intruders.

On the north-west is Afghanistan, another mountainous state, "the land of rocks and stones and sanguinary feuds." Unlike the Tibetans, the Afghans have constantly disturbed the peace of their neighbours, India and Persia, by raids. British troops have frequently been engaged in heavy fighting. Unruly states like Afghanistan cause trouble not only in their own neighbourhood, but among the Great Powers, who, through jealousy of one another, prevent satisfactory control by any one of them. The King of Afghanistan tried but failed to introduce western ideas, for the Afghans are not so adaptable to new customs as the Japanese were.

The country of Persia is so placed that although nominally independent it has great importance for both Russia and Britain. To Russia it would be, with the help of a railway, one more gateway to a warm sea—the Persian Gulf. For Britain it has a twofold importance—it is an outpost of India and it contains rich supplies of oil. As an outpost of India it is necessary that we should prevent its control falling into the hands of any hostile Power. Along the Persian coast lies the great world route from Europe through Constantinople and Bagdad to India. Germany realized the importance of this route. This fact accounts for the rapid increase of German power in the Balkan 'corridor' countries, for the Berlin-Bagdad railway scheme, and for German intrigue in Persia. At present it is chiefly an air route, but a linking up of the railway between Bagdad and Karachi seems certain.

A few years before the Great War, Russia and Britain agreed to confine their interests in Persia, the one to the northern part and the other to the southern. The British sphere of interest was much the smaller in area, but it gave control of the narrow outlet from the Persian Gulf. This was some safeguard against any hostile troops being

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transported from the Persian coast to India or of pirate attacks on shipping. The interior was to be free, but gradually Russian and British interests covered the whole country. Since the War and the Russian Revolution, Persia and Britain have made a treaty under which the latter recognizes the independence of Persia, and undertakes to supply capital to build railways, to develop irrigation, to give advice on government, and to provide troops for police purposes.

British control in Persia may appear selfish to some people. But here the native peoples (some 10,000,000), widely scattered and separated by mountains and deserts, of mixed race as a result of many conquests, superstitious, and careless of reform, are unlikely to form a strong, united country. Here, as in India, British support secures better order and government over the outlying provinces than the Persians seem likely to achieve by themselves.

West of Persia lie Turkish Kurdistan to the north, and Mesopotamia (Iraq) to the south. Iraq was formerly part of the Turkish Empire, and became a mandatory country under the British Government. Britain has since agreed to recognize Iraq as an independent state. Its deposits of oil are important, and irrigation has almost boundless possibilities. But it is a country that has always been subject to raids from unruly desert tribes. The more prosperous it becomes, the more valuable it is to the raiders. Hence the need for strong government. Although other Powers may be jealous of British influence here, it is recognized that the world will benefit from all that Iraq can give it only so long as peace is secured.

The lack of natural boundaries makes this a difficult task, and there is always the factor of the Mohammedan religion. This is the only tie which unites the Arabs on the west with Persia on the east.

The huge desert peninsula of Arabia is inhabited by tribes which, although they lead a similar wandering life and speak the same language, are very hostile to each

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other. They are no less hostile to outside interference, as the Turks found. It is this truth which makes the work of Lawrence in winning their support on the British side during the War so remarkable.

Partly owing to the warlike nature of its peoples, and partly to the steep escarpment which Arabia presents to the Red Sea, only the coastal regions have come under outside control. In the heart of the desert lies the Nejd, a group of Arab tribes under a strong military ruler. The Yemen, in the south-west, is an independent and prosperous part.

On the eastern and southern coasts are other isolated provinces. Round the south-east is the kingdom of Oman, which is mountainous inland, but fertile along the coast. Muscat is the capital and trade centre. Oman at one time included Sokotra and Zanzibar, and still has extensive trade with both India and East Africa, notably in smuggled rifles. Because of the overseas trade, British influence is widespread on both the eastern and southern coasts. Aden has been British since 1839, and the island of Perim, in the Strait of Bab-el-Mandeb, since the Indian Mutiny. They both guard the route to India. Sokotra became British in 1886. The Kuria Muria Islands, close to the Oman coast, and the Bahrein Islands, in the Persian Gulf, are of value for police purposes.

Along the Mediterranean coast lies the remainder of the former Turkish Empire, now administered under mandates by France and Britain. There is no part of the world which has occupied a more important place in history than Palestine and Syria. Separated from Mesopotamia by the great Syrian Desert, and shut in by mountains, these lands have in the past formed the link between the great empires of Egypt, Babylon, Assyria, Greece, and Turkey. From Biblical times onward Crusader and Saracen, French armies under Napoleon and British under Allenby, have lost and won campaigns which altered the course of history.

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Here, too, originated three of the great religions of the world, Jewish, Christian, and Mohammedan. Jerusalem is a sacred city to all three. This religious aspect presents the greatest difficulty to-day. Palestine under the British mandate (which includes Trans-Jordan) is developing rapidly. The Jews are encouraged to settle there, but Arab interests are not overlooked. The Arabs object to Palestine being regarded as a Jewish state. The French in Syria also find difficulty in dealing with the Arabs, for the mandate covers not only the narrow, densely populated belt with fifty miles of the coast, but stretches out beyond the Euphrates even to the upper waters of the Tigris, almost enclosing Iraq on the north.

Syria has been, from time to time since the War, the meeting-ground for Arabs who aim at the complete independence not of Syria only, but of Syria including Palestine, of Mesopotamia, and of Arabia. It is quite certain that no Arab state could secure unity over this wide area, and it is equally certain that attempts to make these parts independent countries would not long succeed. And the religious aspect of such a movement would have widespread results in India and Africa, as well as in France and the British Empire.

Turkey, an empire which at one time knocked at the gates of Vienna, and included the whole of the Balkan peninsula, Egypt, Asia Minor, Syria, Palestine, Mesopotamia, and Arabia, has now become a republic, and has shrunk in territory to Asia Minor, shut in between the Black and Mediterranean Seas, except that across the Bosphorus, Constantinople (now Istanbul) and the country west of it up to the line of the Maritsa river, including Adrianople, is now once more Turkish. Neither the Bosphorus, the Dardanelles, nor the Maritsa must, however, be fortified. But Turkey is a republic which has rapidly adopted western ideas, and although the population is less than 14,000,000 and the country poor and mountainous, the Turks are showing unwonted energy. With improve-

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ments in communications it seems likely that the country which was once regarded as the 'sick man of Europe' will once more regain vigour.

Constantinople (Istanbul), standing at the crossways of the overland route to the East and the sea route from the Black Sea, has been from early times a city of importance. For a thousand years a Christian seat of learning, from it

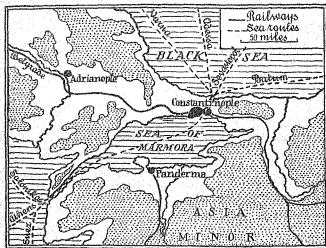


FIG. 22. POSITION OF CONSTANTINOPLE

went Christianity into Russia, and toward it Russia has always looked with longing eyes. France, Britain, Germany, and the Balkan states also have interests there, and it is the rivalry of these interests that leaves the city in Turkish hands. It is, of course, vitally important to Turkey both as one of the great Mohammedan centres and for trade. One-third of the imports reach Turkey through Constantinople, and in that trade British shipping has about six times the tonnage of any other country.

East of Turkey there lie three small republics south of the Caucasus between the Black Sea and the Caspian—

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viz., Georgia, Armenia, and Azerbaijan. Hemmed in between the Soviet state of Russia and the young republic of Turkey, with inhabitants differing in race and in mode of life, and still more in religion, there is little likelihood of federation between them. They are nominally in the Union of Soviet Republics (Russia), and their continued existence is precarious.

AUSTRALIA AND NEW ZEALAND

Turning to the last and smallest of the continents, Australia and New Zealand—the last indeed to be discovered—we have once more to deal with British Dominions. So British in fact, that, apart from a small and lowly race of aborigines in Australia and the Maoris in New Zealand, there is no other race to consider, as is the case in Canada and Africa. Separated from us by 12,000 miles of sea, although the area of the continent is not much less than that of Europe, its population is less than the population of London. The teeming populations of China, Japan, India, and Malay would welcome opportunity to settle there, and much at least of northern Australia is suited to them climatically. But the Australians realize that to admit a coloured race even from India or British Africa would begin such a chain of consequences that no man could foresee the result. Therefore, although there are vast open spaces, these must await development by white immigrants only. Much indeed has little likelihood of development. The physical character of the continent makes the coastal belt the most suitable for settlement. Round the Australian coast lie the six capitals of the separate states, and in these cities live nearly half the total population. Deficient rainfall makes the interior desert or dry grassland. Much has been done by artesian wells to make up for this deficiency of rain. Science will no doubt do more. But this is a case where man's conquest of Nature has distinct limits, and it is very doubtful

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if the interior could ever carry a large population. The fact, then, that only one hundredth part is being cultivated must not mislead us about the remainder.

In 1901 the six states of Australia were united into a Commonwealth. Its capital, Canberra, is established on a virgin site, and here the Commonwealth Government controls immigration and all other matters which concern the states as a whole.

The Dominion of New Zealand, on the other hand, is a country mostly capable of cultivation, and, like Australia, it is intensely British. Climatically, conditions are much more similar to those in our own islands, so that here British settlers easily reproduce the homes from which they come. New Zealand, therefore, adopts the same policy toward coloured races as Australia. About the same size as Britain, its population is as yet only about 1,400,000, and there is ample scope for further development.

Both Australia and New Zealand have little empires of their own. Australia has British New Guinea (Papua), to which, since the War, has been added the mandate over the former German Guinea. Thus the eastern half of this large island is under Australian rule. In addition, there are the Solomon Islands and the Bismarck Archipelago. New Zealand has the Auckland, the Chatham, the Cook, and other islands in the South Pacific, and also the mandate over the western island of Samoa.

North and east of Australia the Pacific islands reflect in a marked degree the way in which every Power to-day touches other Powers in its world relationship. We have already seen its effect in the East Indies, where the Dutch, the Portuguese (in part of Timor), America, Japan, Britain, and France are closely concerned. This is equally true farther out in the Pacific. Between the American islands of Hawaii and the Philippines, Japan has under mandate all Germany's Pacific islands north of the equator. The chief are the Marianne or Ladrone group, and the Caroline

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and Marshall groups. The island of Yap, which is near the Philippines, and now Japanese, is also important to the United States, because it controls the only direct cable between America and the Dutch East Indies. Just south



FIG. 23. POLITICAL MAP OF THE PACIFIC IN 1914

From "The New World: Problems in Political Geography," by Isaiah Bowman (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

of the equator is Nauru Island, the mandate for which both Australia and New Zealand desired to have, its phosphates being valuable to agriculture. The mandate is, therefore, administered partly by the British Government and partly by the Governments of Australia and

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New Zealand, each of which secures thereby its due proportion of output. Between the equator and the South Tropic the French have Tahiti, the Marquesas to the east, New Caledonia and dependent islands to the west, close

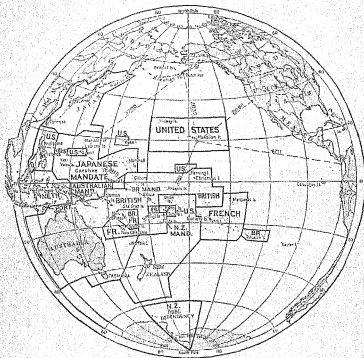


FIG. 24. POLITICAL MAP OF THE PACIFIC TO-DAY

From "The New World: Problems in Political Geography," by Isaiah Bowman (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

to Australia. Between them there is the British group of Fiji, Tonga, Ellice, and others, Samoa (New Zealand), and some American islands, while in the New Hebrides, Britain and France jointly share the government—a condition known as condominium.

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In conclusion it is well for us to realize that 480,000,000 people live under British rule. But more important even than number is the fact that they are different races, in different stages of civilization, and of different religions. Half the Empire is within the tropics, where the white man can live with comfort only under certain conditions, and forms, therefore, a small minority. In India, for instance, there are only about 125,000 British among over 350,000,000. Geographically the Empire lies almost entirely outside Europe, a sixth of it in Asia, a quarter in Australia and New Zealand, a quarter in Africa, and a third in the Americas. It has spread over the seas, and by means of the sea communication is maintained. In nearly every case in America, in India, in Africa, and in Australia the coasts were first occupied. Along the routes to these colonies first watering-places, then coaling-stations, and more recently oil depots were necessary for shipping: in the Mediterranean Gibraltar, Malta, and Cyprus; in the Red Sea Perim, and Aden near by; on the sea route to India Point de Galle and Colombo; farther east Penang, Singapore, Labuan, and Hong-Kong; on the African Cape route to India Ascension, St Helena, Freetown, Walvis Bay, Cape Town, Port Elizabeth, Port Natal, Mauritius, Zanzibar, the Seychelles; where the Aden-Australia route crosses the Cape-to-Colombo route Diego Garcia, and the Chagos Archipelago; on the route from Colombo to Australia the Cocos or Keeling Islands; on the Cape Horn route the Falkland Islands. These are vital possessions. But so great an Empire and so diverse a population cannot be held together by force. It remains united only by common interests, liberty, justice, safety, and prosperity.

PART II

REGIONAL GEOGRAPHY—EUROPE

CHAPTER V

EUROPE—GENERAL CONSIDERATIONS

We have seen how man has distributed himself over the world, and that the European nations or their offshoots control most of the world. Why is this? Europe has many advantages.

Its central position in the land hemisphere makes access by sea easier than from any other continent. It is deeply cut by inland seas—the Mediterranean and the Baltic. Itself a peninsula of Asia, it is a continent composed of peninsulas. Its coastline is longer in proportion to its area than that of any other continent. As a result no part is far from the sea: in western countries not more than two hundred miles, and even in Russia not more than four hundred. The shallow seas covering the continental shelf lead to high tides. This, of course, does not apply to the Mediterranean, which is a deep sea. Ports can be built far inland, reducing costs of transport. Transport by road, railway, and canal is made the easier by a high proportion of lowland, in which respect Europe is again the most favoured continent. More than half of its area is below 600 feet. This in turn, renders the rivers more useful for navigation. The arrangement of its mountain system, running east-west, allows the sea's moderating influence on temperature to penetrate far into the land. Owing to the fact that most of the continent lies north of latitude 45°, and on the west of the land mass of Eurasia, it has the benefit of the prevailing westerly and south-westerly winds, not only maintaining equable tempera-

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tures, but bringing adequate rainfall. The low relief and the climate enables a larger proportion of land to be cultivated than in any other continent, and its crops are heavier and more varied than elsewhere. It is rich in minerals, particularly coal and iron. Its industries and its food-supply support a dense population of energetic peoples, which ensures cheap production. To the food-supply of the land must be added the harvest of fish from the shallow seas.

PHYSICAL DIVISIONS

The relief map shows three main regions: (a) the highlands of Scandinavia and parts of Finland and Scotland, (b) the great plain extending from the shore of the Bay of Biscay across Northern Germany to Russia, (c) a mountainous region extending across the south of Europe. In addition to many ranges of lofty fold mountains, whose general direction is from east to west, there are several plateaux and lowland basins enclosed by these ranges.

The general effect upon communication is that east-west travel along the plain and by sea along the Mediterranean is rendered easy, but north-south traffic between the two is confined to a few natural gateways, like the Carcassonne gap followed by the Canal du Midi, the Rhône valley, the Vardar-Morava valleys, the Bosphorus, and the Dardanelles, and a few routes by mountain passes or tunnels.

CLIMATIC DIVISIONS

The major regions may be classified as follows:

(a) The **west coast area**, comprising the west and south-west coasts of Scandinavia, the lowlands facing the North Sea, the English Channel, and the Bay of Biscay, and the north coast of Spain. The British Isles are also included in this region. This is the temperate region, with rain at



FIG. 25. MODEL OF THE CONTINENT OF EUROPE

From *Highlights of Geography: Europe*, by D. S. Jordan and K. D. Cohen (The World Book Company, Yonkers-on-Hudson and George G. Harrap & Co., Ltd., London)

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all seasons, but mostly in autumn, with cool summers and mild winters.

(b) The **Mediterranean region** of the southern peninsulas, with hot, dry summers, mild winters, and winter rains. Certain areas, however, like the Meseta of Spain, must be regarded as a distinct subdivision of this region, and will be dealt with later.

(c) The **region of Central Europe** lying east of (a) and north of (b), with cold winters, warm summers, and chiefly summer rains. The eastern limit of this region may be indicated by joining the Baltic to the Black Sea by a line from Königsberg to the mouth of the river Dniester.

(d) The **region of Eastern Europe** which lies east of (c), with very cold winters, hot summers, and heaviest rainfall in July and August. The January isotherm of 32° F. follows the south-east coast of Scandinavia and Denmark, and then runs almost due southward to the coast of Yugoslavia, where it turns eastward along the northern shores of the Black Sea to cross the middle of the Caspian Sea into Asia. This indicates that temperature in winter falls from the west to the east in Europe. The July isotherm of 65° F. follows the shores of the Bay of Biscay to the mouth of the river Loire, and then turns in a north-easterly direction across Europe. So that in summer temperatures increase from the north-west to the south-east.

The variations in pressure can best be remembered in relation to three well-defined areas, that of low pressure near Iceland, that of high pressure near the Azores, and the continental area, which is high in winter and low in summer. In winter the Icelandic low pressure deepens, and deep depressions advance from the south-west generally toward the north-east. As pressure in winter is high over the continent gradients between high and low pressures are steep, and the north-west of Europe is subject to severe storms, high winds, and heavy rain.

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In summer this low-pressure area is less pronounced, and as pressure is then also low over the continent, storms are less frequent and less intense; further in summer the Azores high-pressure area is both more pronounced and extends farther northward. The winds which result from this distribution of pressure blow chiefly from the west, south-west, or north-west, over most of western and central Europe. But they are less constant and less strong the farther they are from the west coast. Climatic factors will be further dealt with in describing conditions affecting the British Isles, the Mediterranean countries, and the other regions referred to above.

VEGETATION AND CHIEF CROPS

There are five main natural belts of vegetation, which merge very gradually one into the other: tundra, coniferous forest, deciduous forest, steppe, and Mediterranean forest.

The tundra is found in a narrow strip along the Arctic coast. Except for a few weeks in the year, it is a frozen desert, where only mosses, lichens, some herbaceous plants and low-growing bushes survive. In the few weeks of summer plants have to grow, bear seed, and store food for the winter. Here man must hunt and fish or herd reindeer to live. He has no leisure. He moves northward and southward with the seasons, following his herds.

Coniferous Forest. Southward hardy trees of the cone-bearing type gradually increase in number—spruce, larch, pine, and fir, with needle-shaped leaves, which allow the snow to slide off, reduce transpiration, and offer less resistance to cold, dry winds. Among them also are many small birches. This forest belt, from 300 to 600 miles wide from north to south, stretches across Europe from Scandinavia (except in the high mountains, where tundra reappears) to the Urals and beyond, widening eastward. This indicates the growing severity of winter as distance

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from the west coast increases. The spruce forests shut out most of the light, but where pines and larches prevail bushes and other plants live among them. Along the river margins, where water is more plentiful, meadows occur in places.

These forests yield valuable products. The pine log, straight and strong, is used for wooden ships and for cutting into timber for houses. The spruce for masts, telegraph and scaffold poles, and pit-props. Resin, turpentine, tar, and wood-alcohol are obtained from them. The paper-making trade is largely dependent upon wood-pulp, chiefly made from pine-trees. Its branches are used for mats, its bark for tanning leather, and from its deep, strong roots twine is made.

Deciduous Forest. As climatic conditions improve southward and westward, broad-leaved trees begin to appear and increase, until the conifers are found only on the poorer soils or bleaker uplands. Deciduous trees shed their leaves in autumn, to protect themselves against damage by winter winds and also against excessive loss of moisture during the windy season, when frosts may cut off the supply of water to the roots. The familiar deciduous trees are oak, beech, elm, and ash, the first two often forming large woods by themselves. Along river valleys or on marshy ground are found birch, poplar, willow, ash, alder, and rowan trees. Oak is famous for its strength and its resistance to rot. Beech is not so valuable, but, like elm, it keeps out damp better than other woods, and is used for shipbuilding and for making sabots and cheap furniture. Both oak and beech yield seeds valuable for pig-food. From birch furniture is made, and its bark contains useful oil for leather.

Along the lowland of the west these woodlands have been thinned out. Rich grasslands and cultivated crops are now more conspicuous than forests. The characteristic of this deciduous forest and its accompanying vegetation is the resting season, when the leaves are shed.

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The two industries connected with forests are lumbering and the hunting of fur-bearing animals. The chief difficulty in lumbering is the question of transport. For this reason felling takes place in the winter months, when the unevennesses of the ground are levelled up by snow, and stores of logs are made on the river banks, so that the timber can be floated down in the spring. The most profitable lumbering regions, therefore, are those where the rivers flow in the direction of the market. Norway, Sweden, Finland, and Russia have these advantages. Of the total acreage covered by forests in Europe 600,000,000 acres are coniferous and 200,000,000 are broad-leaved or deciduous. In Finland and Sweden the rate of cutting exceeds that of growth. The demand for timber is increasing, and most European countries have schemes of afforestation in hand to meet this. But there are great reserves in Russia, though the difficulty of transport has not yet been overcome. The hunting of fur-bearing animals is now of little importance in European forests.

Steppe Land. The steppe is found in the interior of continents, where the rainfall is insufficient for the trees, the winter severe, and the summer hot. As a rule, the rainfall is less than twenty inches. In Europe, the steppe stretches eastward from Rumania toward the Lower Volga basin, and there are also stretches of it along the foot of the Carpathians and in the plain of Hungary. The word is Russian, meaning 'unwooded tracts with useful vegetation.'

The flocks and herds move over wide areas of steppe in groups, and the inhabitants follow them. Everything needful for man is obtained from the animals: wool for felt and rugs, leather and hides for shelter, raiment, and utensils, milk and flesh for food. Everything possible is made of leather so as to be portable. Horse-flesh ranks superior to mutton and beef, both of which are somewhat despised. Milk is the chief food, and is often fomented into a drink called *koumiss*, but some is made into butter

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and cheese. Animals are rarely slaughtered. Family life is united, owing to the need for many hands to marshal animals, and the head of the family has supreme authority. Attempts have been made in Russia to induce steppe-dwellers to cultivate some areas, but they are very conservative, and despise agriculture.

Mediterranean Forest. The term 'forest' is almost misleading, for destruction has been so widespread. But the patches of forest and woodlands that remain have many distinctive features. Wherever the conditions of a hot, dry summer, with rains only during the mild winter, prevail, evergreen trees—the pine, cedar, cypress, cork-oak, and olive-tree—are found. Deciduous oaks and plane-trees are also found where the ground retains sufficient moisture. But the effect of the climate is to reduce the general height of trees, to keep their leaves small and leathery, and to increase woody covering of trunks and branches. The dry season is unfavourable too for climbing plants, and the forests and woodlands would be open but for dense growths of evergreen shrubs, which flourish particularly in places where the larger trees have been destroyed. Laurels, myrtles, and other evergreen shrubs grow so densely in some parts that progress through them is impeded. A considerable area of such vegetation is virtually waste land, and is called *garigue* or *maquis* by the French. Cultivated trees, the chestnut and walnut, as well as the olive, and ornamental palms and plants abound in favoured spots. The agricultural aspect of Mediterranean vegetation will be dealt with later. (See page 312.)

Cultivated Plants. In Western Europe most of the deciduous forests have been cleared, and the land used for the cultivation of many important crops. It is well to understand the chief factors which concern plant growth.

Soil. The best soil is a mixture of sand, clay, and decayed vegetable matter called humus, but the chief

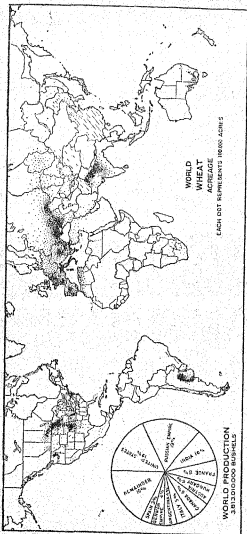


FIG. 26. WORLD WHEAT ACREAGE

From "Modern Business Geography," by Ellsworth Huntington and Sumner W. Cushing (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

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purpose of the soil is not the supply of food, but the provision of support and water.

Water. Water is absorbed by the roots, passed through the plant, and exuded by pores, or stomata, in leaves and stems. The water carries with it minerals from the soil, which the plant retains. It is water that keeps leaves and stems stiff and able to carry their own weight, and shortage of water at once results in wilting.

Air. Plants obtain their food through the air by means of sunlight. It enters the pores of the leaf; green cells extract the carbon, unite it with water to form starch or sugar, while the oxygen is breathed out again. But these green cells can function only in sunlight. Each type of plant has certain conditions of temperature under which it best flourishes. Ice-cold water is useless to plants.

The distance toward the Poles, or similarly the height up a mountain-side, over which any plant may extend, depends upon the length and average temperature of the growing season. The northern limits in Europe of some important crops should be noted.

Cereals. The chief cereals are wheat, maize, oats, barley, rye, rice, and millet. Wheat bread is the chief food in Britain, France, and the United States; rye bread in Germany and Russia, oatmeal in Scotland; maize (corn) in Italy; and rice in the Far East.

Barley, which is the hardiest of them, grows farther north than the Arctic Circle, but it prefers a warm, fairly dry climate. It is chiefly used in brewing and for sheep-feeding. Wheat will grow as far north as 62° in Norway, but it should be noted that little wheat is grown even in Scotland—that is, north of latitude 55° . The ideal climate for wheat is a long, rather wet winter, with little frost, followed by a cool, rather wet spring, changing gradually to a warm summer, becoming drier as the summer heat increases. It can, however, also be grown as a spring or summer crop. It likes a firm soil, but not too stiff and heavy. Rolling country which gives natural drainage, and

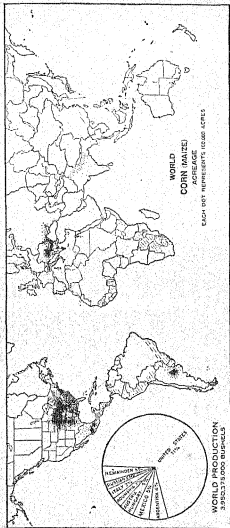


FIG. 27. WORLD MAIZE ACREAGE
From "Modern Business Geography," by Ellsworth Huntington and Sumner W. Cushing (The World Book Company
Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

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which also allows the use of machinery and favours transport, is best for its cultivation.

The production of wheat is one of the world's most important problems. More and more it is being adopted in the diet of peoples who formerly lived on other foods. It is worth noting the date of wheat harvests the world over.

MONTH	COUNTRY	HARVEST REACHES BRITAIN
January.	The southern continents: Australia, New Zealand, Argentina, and Chile.	April-May.
February.	India (winter crop).	June-July.
March.	India and Upper Egypt.	" "
April.	Lower Egypt, Syria, Asia Minor, Mexico, and Cuba	July-August.
May.	Northern Africa, Northern Asia Minor, China, Japan and parts of the United States.	" "
June.	Southern peninsulas of Eu- rope, and Central and Eastern United States.	August-September.
July.	France, Southern Russia, Northern United States, Ontario, and Quebec.	October-November.
August.	Western Europe and East- ern Canada.	August-October.
September.	Scotland, Sweden, and Nor- way.	September-October.
October.	Finland and North Russia.	November-December.
November.	Peru and South Africa.	January-February.
December.	South Australia.	April-May.

The northern limit for the growth of maize extends approximately from the mouth of the Loire eastward, curving northward round the Black Sea. This is because maize needs warm conditions, with medium rainfall, long, hot days and warm nights, and light summer rains at fairly frequent intervals. The chief uses of maize are for brown bread, cornflour, starch, and as food for poultry and horses.

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Vine. The northern limit of the vine runs from the west coast of France eastward, a little to the north of the maize limit, until near the Black Sea it follows the coast more closely, reaching the Caspian in about latitude 45° N. Its most northerly limit is in Germany, due to summer heat increasing with distance from the western coast. It

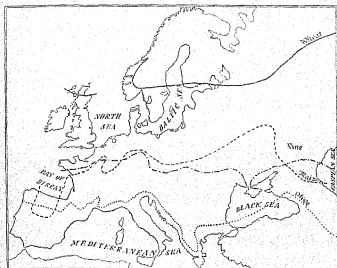


FIG. 28. LIMITS OF CULTIVATION

needs a long, dry summer, and moderate rainfall, chiefly in winter and early spring. Too much or too little rain makes grapes either watery and acid or small and sweet. Sunshine is essential, so that hill-slopes facing southward are terraced to receive the sun's rays at a higher angle, and also to provide good drainage. The chief vine-producing countries are France, Italy, and Spain. The vintage requires far more labour than the cultivation of the vine. In France the chief regions are in Champagne, the valleys of the Allier and Loire, the Garonne and Dordogne, the

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valley of the Saône, the lower Rhône valley, the Côte d'Or in Burgundy, and the plains of the Midi. Italy has a larger area under vineyards, but the yield is not nearly so good as in France. This is due to a lesser rainfall and thinner soil. The vines are grown on the southern sunny slopes of the Alps, the plain of Lombardy, the Arno valley in Tuscany, and in the south in Calabria and Sicily. Spain has vines in the river valleys on the lower slopes of the Pyrenees and on the southern coasts, notably round Jeréz, Barcelona, and Valencia.

Portugal grows vines in the Douro valley, where port-wine is produced, in the Tagus valley, and round Lisbon.

Germany has a large area under the vine, with a high yield. The chief regions are the Rhine valley and its tributaries, the Neckar, the Main, and the Moselle. Other regions of vine production are the valley of the Theiss, the valleys of Yugoslavia round Belgrade, in Rumania, south-west Russia, and in the Crimea.

Beet-sugar requires moderate rainfall, about 30 inches, a summer temperature averaging about 65°, plentiful sunshine, and friable, well-drained soils. It needs to be planted in deeply ploughed land, and requires a considerable amount of labour. It is a valuable rotation crop. If grown continuously on the same soil disease attacks it. Apart from its use for sugar production, its by-products are valuable for animals. Its cultivation was introduced during the Napoleonic wars when the supply of cane-sugar was cut off by the British blockade. But Germany has surpassed France both in quantity and in the development of special machinery. It is now grown widely in Europe, but the chief areas are the valley of the Oder, parts of Bohemia and Moravia, Picardy and the Loire valley in France, Flanders, Holland, and the 'black earth' region of Russia. Some beet is now grown in Eastern England.

Flax. Two important fibre-producing crops of Europe are flax and hemp. Flax can stand a wide range of climate,

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and likes a firm, moist soil. The new Baltic states which were formerly part of Russia are the chief regions, but it is grown also in Belgium and Northern Ireland. The fibres are in the stem, and are from eight to twenty-five inches long. Much labour is needed in the processes of separating it. Conditions favour the manufacture of linen in Belgium, as the water of the rivers is free from lime salts, a fact which makes it suitable for bleaching flax. The canal system makes transport cheap. Belgium also is near to densely populated parts of Europe, and has a ready market. Flax-seed is used for producing linseed oil and oil-cake for cattle.

Hemp can stand a wide range of temperature. Fibres are found in the leaf as well as the stem, and they are both coarser and stronger than flax. The chief producing countries are Russia, France, and Italy. It is used in making rope and canvas.

MINERALS

Minerals and metals cannot be considered in belts like vegetation, for their distribution has no relation to climate. Metals are found as ores deposited from solutions, chiefly as veins in cracks in old, fractured rocks. Metallic ores also occur in igneous rocks. Neither metallic ores nor other minerals are, as a rule, found in new rocks. The most important minerals are coal, petroleum, asphalt, and salt, and the ores of iron, tin, copper, zinc, nickel, manganese, aluminium, lead, and silver. Gold and platinum are found pure. Coal, iron, and petroleum so far exceed the others in importance that we must consider them in more detail. The closely related subject of the development of water-power must also be examined.

Coal is of three principal kinds: house coal, which is bituminous; anthracite, which is smokeless and requires considerable draught, but gives great heat, with little waste in ash; and lignite, or brown coal, in which the compressed vegetation is less consolidated than in the

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others. Peat consists of compressed plant remains which have become partly carbonized, and is an important fuel in some regions.

Coal is important not only for its direct use as fuel, but for the production of coke and by-products such as gas, tar, ammonia, and benzene. These products are obtained by burning the coal in retort ovens. For countries with great shipping interests coal is a very important export. Ships carrying general cargoes of foodstuffs and raw materials are attracted to ports where coal can be obtained as a return cargo. Britain, Germany, and Poland are the only European countries with a large export trade in coal. Most of Germany's export is across land frontiers. In Britain coal, measured in bulk, forms four-fifths of the export trade in normal times. The advantage, therefore, of having coalfields near the coast is clear. Overland transport of coal adds considerably to its cost. Inland coal is thus utilized as far as possible on the spot. It is increasingly being used to produce electricity, in which form its power can be transmitted long distances cheaply. Some of the most productive British coalfields are near the coast—namely, the Fife-Midlothian, Northumberland-Durham, and Kent fields, facing the continent, and the Ayrshire, Cumberland, Flint, and South Wales coalfields on the west coast. Others occur where the island narrows and are not far from the sea; the Lanarkshire and the Pennine coalfields (Yorkshire-Derby-Nottingham and South Lancashire and North Staffordshire). The mid-land coalfields, South Staffordshire, Severn, Forest of Dean, Bristol, Leicestershire, and Warwickshire, are smaller, and serve local needs. Most of these coalfields are some distance from ports.

In Germany the coalfields lie inland, and are near frontiers:

- (a) The Ruhr, with Dortmund as the chief mining centre, produces two-thirds of Germany's coal,

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and exports large quantities down the Rhine to Holland, Belgium, and overseas, as well as up the Rhine to Switzerland.

- (b) The lignite of Saxony (round Zwickau, Chemnitz, and Halle) is now used extensively for producing electric power.
- (c) In Upper and Lower Silesia. Most of the mines in Upper Silesia now belong to Poland, but the mines of the smaller coalfield of Lower Silesia, near Breslau are still German.
- (d) The Saar coalfield in the southern Rhineland, is not now German, but has been placed under French control till 1935, when the question of its future possession will have to be decided.

Poland has the major part of the Upper Silesian coalfield, and exports a quarter of her output. Other countries have little or no excess for export. In France the most important coalfield is in the north-east, extending from Lens into Belgium. The others—viz., those round St Étienne, Le Creusot, and Alais—are small and far from the sea. In Czechoslovakia coal deposits lie south-west of Prague, along the south of the Erzgebirge. Both lignite and true coal are raised in large quantities in the province of Bohemia. Lignite is mined round Carlsbad and Teplitz, and true coal round Pilsen. In the province of Moravia lignite is mined near Brünn, and hard coal in the Teschen district. Austria has only a little anthracite, but lignite abounds in the Styria province of the Eastern Alps. Russia has a considerable output from the Donetz basin, as well as some near Moscow and Tula.

Thus, most of the coal of Europe lies north of latitude 48° N. The only coalfields south of this are either small or have coal of poor quality. The countries of Europe which are practically without coal are Ireland, Holland, Denmark, Norway, Portugal, Switzerland, Italy, and Greece. Ireland imports coal from Ayrshire; Holland

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from Germany and Britain. The other countries use chiefly British coal, but the demand has declined since the War. This is partly due to the development of water-power, particularly in Norway and Switzerland. As a compensation for the lack of coal some countries like

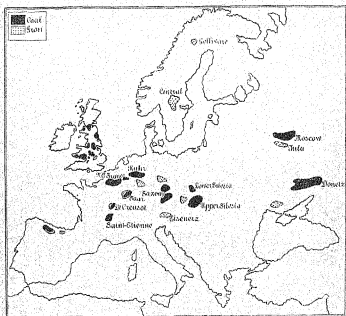


FIG. 29. COALFIELDS AND IRONFIELDS OF EUROPE

Ireland, Sweden, and Denmark, have large supplies of peat.

Before the War Europe and North America together produced over 1,200,000,000 tons of coal annually, and the European output exceeded the American. European production is still ahead, and now totals about 600 million tons, obtained approximately as follows: Britain 248, Germany 143, France 55, Poland 37, Russia 47, 116

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Belgium 27, Czechoslovakia 15, the Saar field 13, and the Netherlands 12.

Iron. It is probable that the earth's crust contains twice as much aluminium as iron. But iron is far the more useful. The qualities of iron which account for its immense importance in modern civilization are its strength and hardness, its adaptability to diverse uses, and its magnetic property. Iron occurs in many ores: a black ore very rich in iron and known as magnetite, found in Sweden but not in Britain; hæmatite, a kidney iron ore found in the United States, in the north of Spain, and in Britain in the Furness district, North Wales, and the Forest of Dean; a carbonate, known in England as black-band or clay-band iron-stone, is found abundantly in the coal measures; and brown ore, including Cleveland iron ore, found in the Jurassic and Cretaceous rocks.

There are certain features about the distribution of iron which must be noted. In the weathering of rocks the heaviest components—viz., the metals—are the last to be transported elsewhere. Iron deposits are found most concentrated, therefore, where ancient highlands have been reduced to a peneplain, and where the more resistant blocks are faulted or tilted to form scarplands. In porous rocks of this kind iron may be found distributed throughout the whole mass. In other cases, for example, in the Erzgebirge (ore mountain) in Styria, the ore is found in a highly concentrated form. Thus, the ore is most abundant in areas which are closely connected with the old earth blocks of central Europe—viz., the Bohemian 'diamond,' the Hartz, the Urals, the Rhine Highlands, the central plateau of France, Spain, and Sweden. It is so abundant that it is worked only where the ore is rich in iron—over 25 per cent. The most profitable areas are those which occur near coal, and those which are near the sea, which reduces the cost of transport.

Coal and iron are found close together in Britain; also in the Sambre-Meuse valley and at Le Creusot; in

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Lorraine, the Ruhr, Saxony, Bohemia, Upper Silesia, around Tula, and the Donetz basin. These are naturally the great manufacturing areas for steel, machinery, textiles, chemicals, and hardware.

Before the War the world's annual output of iron ore was about 170,000,000 tons. Of this, Europe produced over 100,000,000 and the United States about 60,000,000. Since the War European production has fallen and American output increased. France produces about 50,000,000, Britain 11,000,000, Sweden 5,000,000, and Spain 6,000,000. Germany was the chief consumer, but the Lorraine mines, from which the bulk of the German supply of ore came, are now French. In addition, the Upper Silesian mines are now Polish, so that to maintain the standard of her production of iron and steel goods Germany is largely dependent upon imports.

The countries of Southern Europe having practically no coal or iron are largely dependent upon the northern countries for iron and steel goods.

Petroleum is probably formed by organic substances contained in the rocks becoming distilled. Being free to move through cracks and rifts, it tends to collect in basins and, by capillary attraction, in porous rocks which are often some distance away from the source of supply. Shales often contain oil. The crude oil is sometimes a thick, tarry liquid and sometimes quite thin. The crude oil is distilled to yield petrol, paraffin oil (kerosene), lubricating oils, fuel oils, vaseline, and paraffin wax. The production of the oilfields varies much more rapidly than that of coalfields, and oilfields are more quickly exhausted.

At present the United States, Venezuela, and Mexico produce about four-fifths of the world's annual output, estimated at 1323 million barrels, of which Europe supplies barely a tenth. Of this some 88 million barrels come from Russia. The oilfield on the flanks of the Caucasus and round the shores of the Caspian Sea is,

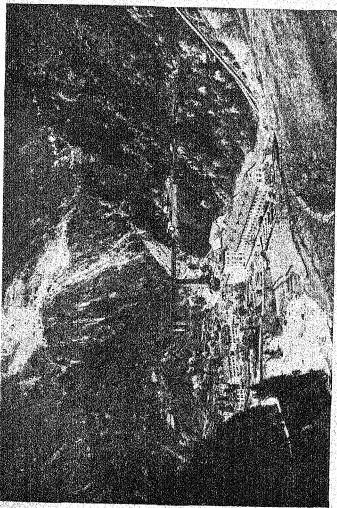


FIG. 30. AN ELECTRIC POWER-STATION AT ANSTEG.
Water from a higher level comes down the pipes (or arches) to the right of the picture.
By courtesy of the Swiss National Tourist Office

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after the United States and Venezuela, the third greatest oil-producing area. Baku is the chief centre, the bulk of the oil being piped over 500 miles to Batum. Grosny, on the northern flanks of the Caucasus, is another centre which sends oil to ports on both the Black Sea and the Caspian. The outer flanks of the Carpathians, round Prahova (Rumania) in the south, and round Borystaw, south-west of Lemberg, in Galicia (Poland), in the north, produce 35 million barrels annually. Both areas suffered severe damage in the War, and are recovering but slowly. There are small centres also in Alsace, Hanover, and elsewhere. Natural gas formed by the most volatile part of the petroleum is also found in most oilfields, but is used commercially only in the United States and Canada.

WATER-POWER

Water-power was used in industry before coal, but its utilization to generate electricity on a large scale is a modern development of increasing importance. For electricity enables industries to be carried on without smoke under healthy conditions, and it can be sent hundreds of miles by cable. Important factors to consider in regard to water-power are the volume of water, the height of the fall, the regularity of supply, and the distance over which the power has to be transmitted. Thus the Niagara Falls are at present more important in this respect than the Victoria Falls in Africa. Although the latter has great potential water-power, distance from populous and manufacturing areas discounts its value. Then, too, the Great Lakes of America act as reservoirs, maintaining a steady supply.

In Europe the Alps is the most obvious area, for lakes and swift rivers abound, fed not only by rainfall, but by the snowfields and glaciers. Switzerland, Italy, and France already make great use of this water-power, and Austria to a lesser extent, for the eastern Alps are lower and drier

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than the centre and west. Norway has abundant rain throughout the year, steep mountains, and waterfalls, and Sweden numerous lakes and powerful rivers. Both have already developed their resources. As these are the countries lacking in coal, water-power is doubly valuable. It is used not only to drive machinery, locomotives, and lighting plant, but in chemical processes, such as reducing aluminium, making chrome steel, and refining zinc; in the manufacture of carbide, and nitrogen products; and in the making of wood-pulp.

CHAPTER VI

THE BRITISH ISLES

STRUCTURE

THE advantages which Europe has over other countries are possessed to an even greater extent by the British Isles. The sea acts both as a protection and a highway. For although the seas to the east and south are narrow, to cross them involves a change of transport, unless one travels by air. Yet the seas are a highway providing cheap and ready communication not only with Europe, but with the Empire and the rest of the world. Facing the Thames estuary, lie the estuary of the Scheldt and the delta of the Rhine, both leading to densely populated, busy countries. Across the Atlantic, the American ports provide a gateway to the most densely peopled parts of the New World. Other journeys of three thousand miles each take one to the Suez Canal, or into the heart of Russia, or to our nearest African possession on the West Coast. Another day or two brings within reach the West Indies and the Panama Canal. The ships of the mainland countries, like Germany or Holland, have long voyages to and fro in these parts.

The narrow seas are also a source of wealth. Fish to the value of £18,000,000 is landed in Britain every year. High tides cleanse the river-mouths, remove silt, and keep channels clear for ships. Towns far inland can thus be reached by ship; for example, London, fifty miles from the open sea, Bristol, eight miles from Avonmouth, and Southampton. The tides are highest in the Bristol Channel, rising forty feet, a rise and fall which may soon be used to provide electrical power.

Estuaries on opposite shores approach each other,

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bringing London within 120 miles of Bristol, Hull within 100 miles of Liverpool, and Glasgow within forty-five

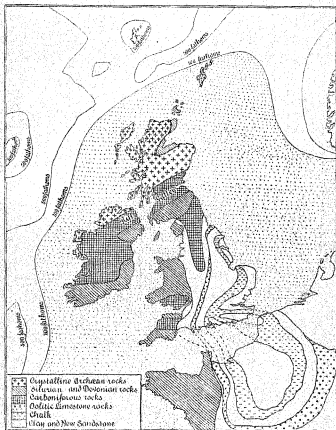


FIG. 31. CONTINENTAL SHELF AND RELATION BETWEEN
STRUCTURAL DIVISIONS

miles of Edinburgh (Leith). Thus, no part of Britain is much over sixty miles from sea, and a central city like

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Birmingham has choice of ports in four directions—London, Bristol, Hull, and Liverpool. The whole country gets the benefit of a mild climate and sufficient water-supply, and work can continue the year through without fear of drought or of excessive heat or cold.

Yet our islands approach the mainland so closely on the south-east that relations with the other countries of Europe are easily maintained. The dangers of 'insularity' are thus reduced.

In structure, Britain is part of the continent. The rocks of the Thames basin reappear in the Paris basin, and there is no doubt that they were once united. Scotland has many of the characteristics of Scandinavia, deeply cut fjords and plateaux of old, hard rock. Animal remains dredged from the North Sea indicate clearly that the Thames was once a tributary of the Rhine, and soundings in the English Channel reveal in the Hard Deep, the channel of an old river that helped to cut Britain off from France.

The structure of the land has had an enormous effect on the life of the nation in all ages. At the present time a line joining the Exe to the Tees serves as a useful index to the main differences in human affairs caused by structure. North and west of this line lie the mountainous parts, composed mainly of some of the oldest and hardest rocks in the world. South and east of it are the younger, softer rocks, lying gently tilted. The mountains to the north-west, nowhere much over 3000 feet, except in Scotland, are the remains of lofty ranges worn down by weathering. Scotland, North Wales, and North Ireland were once united. In the Pennines rocks have been folded into a wave-like ridge, with its crest breaking toward the west. Here the strain caused by folding was so great as to cause fractures (faults), which have produced such features as the deep Eden valley and the Tyne and Aire gaps. In South Wales, Somerset, Devon, and Southern Ireland, however, the grain runs east and west, indicating

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an ancient mountain chain which ran far out into the Atlantic, as well as east into Europe.

To the north and west, then, lie the uplands containing valuable minerals and metals. Coal has been preserved from erosion by down-folds of the strata and deposition of later rocks, and hardened by pressure of the immense weight at one time above it. Iron abounds, and other metals, including lead in Derbyshire and bauxite (for aluminium) in Antrim, and tin and copper occur in veins of the rocks in Cornwall. The rocks themselves are valuable. Granite, slate, millstone grit, limestone (in places changed by the heat of adjacent volcanic rock into marble), and clay known as kaolin, produced by the weathering of granite, are obvious examples.

The younger rocks of the oolitic hills of the south-east, nowhere much over 600 feet high, also contain iron ore, and can themselves be used for building-stone, being soft to work. But there is no coal on this side of the line, except that deeply buried, as in Kent.

North and west the climate is wet, warm, and equable. South and east the climate is drier and more variable between summer and winter.

Population is densely crowded on the coalfields of the north, but more evenly distributed to the south and east, except round London. The north and west are industrial, while the south and east are mainly agricultural. Communications become more difficult as they go westward and northward.

The structure of Britain illustrates well the different types of mountains:

1. **Folded mountains**, for example, the Pennines (in the main). The rocks of which these are composed were once horizontal, as they were deposited by rivers upon the bed of adjacent seas. Earth movements have since lifted them up and, owing to pressure from the east, folded them into a wave-like form, with many minor foldings and faultings. As they were uplifted and folded

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the forces of erosion—rain, rivers, frost, wind-blown sand, sun-heat, and rapid changes of temperature—attacked the surface covering, which in parts has been completely removed, exposing those which form the core. Some of these, less resistant than others, have worn down deeply.

2. Mountains formed by 'Faulting.' For example: (a) North-west Pennines. On the north, south, and west of the northern Pennines faults form relatively steep slopes, though softened by long continued weathering. On its



FIG. 32. SECTION SHOWING UNDISTURBED STRATA OF PENNINE REGION BEFORE FOLDING



FIG. 33. EAST TO WEST SECTION SHOWING UPFOLDED PENNINES—DENUDED

eastern flank the Pennines fold dips below younger rocks. (b) In Scotland, faults occur along the southern edge of the Highlands and the northern side of the Southern Uplands. Between them the newer coal, limestone, and other rocks have been let down between the Highlands, composed of old, hard and crystalline rock and the old rock of the Southern Uplands. The downward slip was accompanied by crumpling, and the Scottish coalfields occupy the basins or synclines. Along the line of the Highland fault earth tremors occasionally occur.

3. Mountains left by Denudation of Surrounding Rocks. For example: (a) the peaks of the Scottish Highlands, which were originally a plateau sloping gently south-east, but have been carved out by rivers and ice action in past ages

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into ridges and valleys; (b) plugs or necks of volcanic rock from which the rest of the volcano has weathered away—for example, the Castle Rock at Edinburgh, Dumbarton Rock, or North Berwick Law; (c) remnants of lava sheets, as in the mountains of Skye, the Sidlaws, and the Ochils;

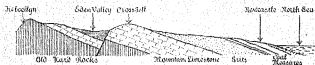


FIG. 34. NORTHERN PENNINES, EAST TO WEST SECTION

(d) the scarp hills of the English plain. In this case the unfolded rocks dip gently down toward the south-west, and the ends of the strata are exposed to weathering. The result is that the softer layers have worn away more rapidly, leaving the harder rocks presenting a steep scarp

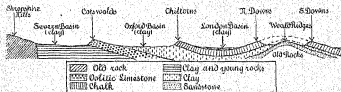


FIG. 35. SECTION ACROSS SOUTH-EASTERN ENGLAND FROM NORTH WALES TO BEACHY HEAD

face to the north-west and a gently dipping slope to the south-east. (See Fig. 35.)

If we start from the London area and travel westward or northward we cross in succession rock formations which are, as it were, chapters of geological history. From comparatively recent alluvial deposits little above sea-level we cross the clays of the London basin, to ascend gently to hills 600 to 800 feet high. These are formed of Cretaceous rocks, of which the chalk is the most conspicuous, with its rounded contours, rolling grassy downs,

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and dimpled hollows, often occupied by beech woodlands sheltered from the wind. From the escarpment we descend to the sands and clays of the plain, which, however, is broken by minor escarpments. At first ploughed land predominates, but westward grasslands increase and trees abound. Rising steadily once more, to cross the Jurassic (oolitic) formations, the country changes in appearance. Stone walls and ploughed lands, varied with abundant woodlands, dominate the scenery. From the highest points the view extends across the plain 600 to 800 feet below to the older, higher uplands in the distance. This limestone escarpment is steeper than that of the chalk, and roads are made to descend in sharp curves. But the line of this escarpment is not so clearly defined across country as that of the chalk, for it has been deeply embayed by the erosion of rivers draining to the north-west. Across the plain below the Severn and Avon make their way in great meanders to the Bristol Channel. Most of the plain is covered with soils lighter than clay, greenish where weathered from Liassic strata, and red over the wider tract of Triassic strata, extending through the 'Midland Gate' of Cheshire. Beyond the boundary of the Triassic plain we find sterner landscapes of the older rocks, the coal measures and mountain limestone of the Pennines, the Mendip Hills, and South Wales, the Old Red Sandstone of the Wye and Usk valleys, Exmoor, and Devon, and the very ancient rocks of Wales and Scotland.

CLIMATE

The term 'weather' applies to the conditions which vary from day to day, and which depend upon the temperature, the degree of dryness or saturation, and the stillness or movement of the air. Climate is the average of these conditions through the seasons as observed over a long period. There are so many influences at work that no description of climate can be entirely satisfactory, but

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it is possible to make the more important aspects clear. It is necessary first to grasp the main facts concerning the world as a whole.

The sun is the source of all energy in the world. If the world were a solid composed of a uniform substance, with a smooth surface, the heat received from the sun would be greatest at the equator and least at the Poles, and would decrease regularly between them.

The surface of the land of the world, however, is not uniform, but composed of different rocks and soils, some of which alternately heat quickly by day and cool rapidly by night, and some more slowly. Further, some soils are clothed with vegetation, while some are bare and exposed. And the land is not flat. Mountain sides which face the sun get more concentrated heat. The direction of general slope of a country and distribution of mountain and plain have a great effect on climate. There is also more sea than land. The heat received by the water surface is distributed to a much greater depth than on land. As the density of water alters with a change in temperature, circulating movements are set up between the dense cold water of the polar areas and the lighter warm water of the tropics. These currents are deflected to the right in the northern hemisphere by the rotation of the earth. The warm current instead of flowing northward, turns north-eastward, and the cold current does not move southward, but south-westward. These currents, however, would have no influence upon the land if it were not for the circulating air above it.

The sun's rays pass through air which is dry and free from dust without warming it. But air containing water vapour or dust absorbs heat, and has the effect of reducing the heating of land by day and also its cooling by radiation at night. Air is thus warmed or cooled chiefly by the earth surface beneath it. Differences of temperature cause the air to circulate between the hot and cold regions, in a way similar to the water movements, but more freely.

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Thus, over the North Atlantic there is a current of warm air moving north-eastward toward Europe, and a current of cold air from the polar area moving south-westward. The movements of these air currents fluctuate much more widely and rapidly than those of the sea. Britain is normally in the path of the warm air current, but sometimes it receives the polar air, and frequently it is in the area where both streams meet. In this case the cold, dense air flows underneath the lighter warm air, and whirls are set up, known as cyclones. Vertical movements of air also modify its temperature. Descending air is warmed by being compressed, and rising air cooled by expansion. As the capacity to hold invisible water vapour varies with temperature, moist air that is forced to rise from any cause tends to condense its water vapour, forming clouds, which act as a barrier to heat rays both from the sun and from radiation.

In considering the climate of the British Isles we must therefore remember that :

1. Because they are islands they benefit from the influence of ocean on the west, and, being small, no part is shut off from this influence.

2. They lie on the west of a great land mass, between latitudes 50° N. and 60° N. The climate, therefore, is a blend of oceanic conditions, with equable temperatures and abundant rain, and continental conditions—viz., extremes of temperature between day and night, summer and winter.

3. The highest land is in the west, and the general slope is eastward.

4. The soils vary considerably, with great effect on local climate; for example, the flat clay vales of south-eastern England hold moisture and keep the air damp and cool, so that fogs are frequent; the low hills of porous rock are drier and warmed more quickly by sunshine, so that the air over them is warmed by radiation.

Temperature. The difference of 10° in the latitudes of

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the north and south of Britain results in a corresponding difference in the sun's altitude. At midsummer the sun reaches 63° above the horizon in Cornwall, but only 53° in the Orkneys. But the summer day lasts two hours longer in the Orkneys than in Cornwall. This, however, does not fully compensate for the diminished heating effect of the sun's rays due to the lower angle. Conversely, at midwinter the sun altitudes are 16° and 6° respectively, and the northern day is two hours shorter than in the south. In winter the low sun and the short day have little influence on air temperature. The winds are then the chief factor. But in summer, when the winds are lighter and the sun is higher, the temperature of the air is chiefly affected by radiation from the heated land surface. The higher the sun is, the more concentrated are the sun-rays upon the land surface, so that in summer the south is warmer than the north. The hottest part of Britain is the Thames basin round London, where the mean July temperature is 62° – 64° F. Around south-east Britain the seas are narrow, and have less influence in moderating the temperature than along the coasts of the south-west, which is therefore cooler. Apart from this consideration, temperature falls steadily northward to 55° F. along the north coast of Scotland, and night temperatures range on the average 5° or 6° above and below the mean temperature stated.

The July isotherm of 60° F.—the line joining places with the same temperature after making allowance for differences of altitude—viz., 1° F. for every 300 feet—bends northward over the land and southward over the sea. This is due to the influence of the sea, which is more marked in the west than in the east, owing to the sea being wider and deeper.

Direct sunshine is much reduced by cloud and fog. For Britain as a whole the sun is visible for only a third of the possible maximum. The coast gets more sunshine than the interior, and the brightest part extends from the

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east coast at the Wash along the south coast to Devonshire and Cornwall. The parts which suffer most from loss of sunshine are the industrial areas, owing to the smoke pall, and the mountainous districts, from cloud. Fog is frequent in still weather. It may result either from cold air moving over a warm, wet surface, as may happen in summer and autumn, or from warm, moist air moving slowly over a cold surface, as may happen in winter and spring.

In winter the sun's influence is of little account. The chief factor is the stream of warm air brought in from the Atlantic by the winds. The January isotherm of 40°F . runs north-south along the west of Britain. This indicates that the west is warm and the east is cold, but due allowance must be made for altitude. Even in Ireland the north-east, which is sheltered to some extent from the south-west winds, is colder than the south-west. A further proof that the winds are the winter source of warmth is that occasionally the maximum temperature for the twenty-four hours in winter occurs in the night.

Snow furnishes a good index of winter temperatures. The only parts of Britain which occasionally pass through winter without a fall of snow are the south and west coasts. Elsewhere snow invariably falls in winter on one or more days. The interior highlands naturally experience snow more frequently, and snow occasionally lies throughout the year in northward-facing gulleys of the highest mountains.

South-east Britain experiences the greatest range of temperature, the mean difference between summer and winter being 25° as compared with 15° for the south-west. The change of seasons from winter to summer is gradual, but liable to sudden fluctuations of temperature, due to change of wind.

Atmospheric Pressure and Winds. Winds are caused by differences in the atmospheric pressure, which is recorded on maps by lines called 'isobars.' Air flows from parts where the pressure is high to parts where it is low, the

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velocity varying with the range of pressure. The outstanding feature of our climate is the frequent flow of warm, moist air from the south-west. This stream of air is warmed by the ocean waters, and benefits the whole island, for the mountains in the west are not high enough to be a barrier, and there are wide openings to the central plain from the Bristol Channel and Cheshire gap. But configuration causes local variation in the direction and force of winds. Records show that on the average only 10 per cent. of the days of the year are calm. On the days forming the other 90 per cent. of the year the wind is from a westerly quarter roughly half the time, from an easterly quarter one-fourth of the time, and from north or south only one-tenth of the time in each case.

In winter pressure is low over the relatively warm waters of the North Atlantic. Vast eddies form, in the way already explained, in the current of air moving toward this Icelandic low-pressure area. In these eddies or cyclones the air whirls round the centre in a counter-clockwise direction. The larger cyclones or depressions are frequently followed by secondary depressions moving in from the Atlantic. These depressions come on an average once every ten days, but more frequently in winter than in summer. The majority pass close to the British Isles in a north-easterly direction, gradually fill up, and so disappear. These too bring chiefly westerly and south-westerly winds, but also easterly and northerly winds. The winds veer from one direction to another as the depression advances. Other frequent routes are up the English Channel, and across the north of England. Cyclones vary in extent and intensity. The meeting of cool and warm air currents in the cyclone causes heavy rain in parts of their areas. Cyclones are thus associated with cloud, rain, and strong wind.

Sometimes, however, the pressure system over the continent extends over our islands. In winter, when the air over the continent is cold, the pressure is high. Air

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flows outward and downward toward the surrounding low-pressure areas. As the air is descending it tends to become warmer, and therefore is likely to pick up moisture rather than drop it. The influence of the continent, therefore, is such that it may displace the warm, rainy weather brought by the westerly winds in winter by a spell of fine, dry, frosty weather, with easterly winds. In summer, when the air over the continent is hot and the barometer low, air flows inward from the west. Thus, the air currents tend to be drawn across the British Isles from the Atlantic, bringing cool and rainy weather.

A third centre of atmospheric action which occasionally influences our climate in summer is the high-pressure area (anticyclone) in the region of the Azores Islands. From this anticyclone air flows outward with a gentle swirl in a clockwise direction. Winds are light, and the sky is clear. Both the Azores 'high' and the Icelandic 'low' are constantly changing to some degree in position and extent. In summer the Azores 'high' swings northward with the sun, and occasionally brings dry, sunny, warm weather to Britain from the south and south-west.

Rainfall. Rain brought by the steady stream of moisture-laden air from the west generally falls steadily, varying in quantity with the relief of the land. Little is deposited on low ground. The amount increases where high land intercepts the air current, reaching a maximum just beyond the highest point where the air begins its descent. For rising air is cooled not only by ascent, but by expansion. Powerful depressions and thunderstorms, however, are often much more local, and heavy rain may fall in a short time over a limited area. Rain in Britain falls at all seasons. Droughts are exceptional. In the south and west October is the wettest month and March the driest. In East Anglia July and August are the months of maximum rainfall. But much rain often falls in a short time as the result of thunderstorms, so that August usually has many fine days. The east has fewer

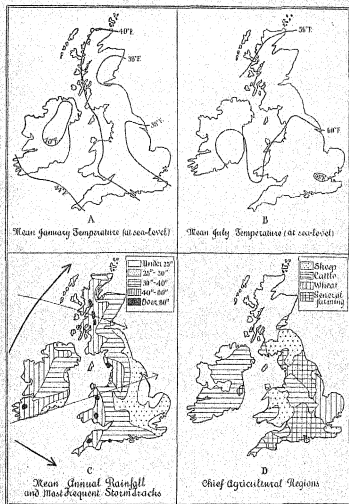


FIG. 36. CLIMATE AND AGRICULTURE

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wet days in the year and a lower total rainfall than the west, the number increasing westward from 150 to over 200 days.

The map of the average annual rainfall bears a striking resemblance to the physical map, showing heaviest rain in the west and on the highest land in any area. Even the low hills of the eastern plain get more than the surrounding lowland.

The areas receiving the highest rainfall are the south-western peninsula, Wales, the Pennines, the Southern Uplands, the Highlands, and western islands. Except along the coast, the whole of these areas receive about 40 inches a year. On the higher parts the amount rises; for example, 50 to 80 inches on Dartmoor and Exmoor, most of the Welsh mountains, the northern Pennines, and the western hills of the Southern Uplands. In Snowdonia and the Cumberland extension of the Pennine highland some parts receive over 100 inches. Most of the English plain and East Scotland have over 30 inches. The lower part of the valleys in the scarplands and strips of the east coast of Scotland get less than 25 inches.

Snowfall, which is included in rainfall figures, is commonest on the high ground in the north, where it falls on fifteen to fifty days in the year. On low ground in the south snow seldom falls on more than a few days, and rarely lies long.

PRODUCTIONS

Crops and Animals. The wetter and more equable west is naturally best suited for pasture. Areas with over 40 inches of rain are seldom good for cereals. In the valleys, where the soil is deep and rich, the grass grows long and luscious. This suits the cow, which uses its tongue in grazing. On the mountains, particularly the drier slopes, the grass is short and crisp, suitable for sheep. Sheep are also kept in large numbers in the eastern counties to pulverize the soil with their feet and to manure it. Pigs

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are kept both in the cattle districts, where they are fed largely on skimmed milk, and also in districts where arable land prevails. The chief meat and dairy districts, therefore, are (1) the plains and valleys of Somerset, Devon, and Cornwall; (2) the plain of Hereford and the vale of Gloucester; (3) the Cheshire plain; (4) the plain of the Midland counties; (5) Ireland; and (6) the lowlands of eastern Scotland.

Industries arising from the pasturing of cattle and sheep are (a) dairying—cream, butter, and cheese (some districts produce famous brands of cheese, such as Cheddar (Somerset), Cheshire, Stilton (Huntingdon), etc.); (b) meat—Aberdeenshire, Southern Uplands, Wales, etc.; and (c) leather manufactures in the Midland counties, Leicester, Northampton, and Stafford, and at Norwich and Ayr.

The eastern counties, being drier but sufficiently well watered, and having a hotter, more reliable summer, are more suited for the growth of cereals. But soils as well as climate control agriculture. Thus, barley is grown on lighter soils than those planted with wheat. The reclaimed Fenland round the Wash is now used for growing potatoes and sugar-beet. In 1900 only fifty-one acres in Britain were planted with sugar-beet, and in 1930 there were over 300,000 acres. This acreage yielded 2,700,000 tons of beet, from which 385,000 tons of sugar were extracted. Stiff clays are difficult to cultivate, and where unsuitable for wheat are often left as pasture or woodland. The soil most suitable for varied crops is loam. On such soil, besides farm crops, such as cereals, roots, clover and pulses, potatoes and garden produce, as well as fruit, can be profitably grown, particularly when near large towns. On the lighter, porous soils—viz., sands, gravels, and limestone—heaths and pine-woods are common, and agriculture is possible only with skilful use of sheep or cattle to manure and pulverize the soil, and thus reduce the danger of drought.

Manufactures connected with agriculture are: brewing

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(from barley and hops), carried on at Burton, Dublin, and all large towns; distilling (from barley, oats, and potatoes) in Scotland and Ireland; the preparation of cider and perry (from apples and pears) in the western counties; vinegar-making (a by-product of brewing); jam-making, chiefly near ports, on account of sugar, notably in East Anglia and Dundee; mustard and starch manufacture at Norwich and York; straw-plait industries at Luton and Bedford.

CHAPTER VII

ENGLAND

Northern England. The outstanding feature is the Pennine Highland. Although it is a barrier between the eastern and western plains, it is not difficult to cross. The hinterlands of Liverpool and Hull each extend to the farther side. In two places crossing is easy at a height of 500 feet by means of fault gaps deepened by rivers—viz., the Tyne and the Aire. Half-way between the Aire and the Tyne is a series of faults known as Stainmore Faults. Thus, the Pennines have three divisions, north, central, and south, the central one lying between the Stainmore Faults and the Craven Faults of the Aire Gap. The two northern parts are broader and higher than the southern. In general, they consist of broad, grassy moorlands, with patches of heather, bilberry, and cotton-grass, the highest points rising to 2000 and 3000 feet. These 'peaks' are mostly flat-topped summits, preserved by a capping of hard grit-stones (Cross Fell 2893 feet, Whernside 2310 feet). The eastern and western slopes have been carved out by rivers into spurs running eastward and westward and separated by broad dales. Linked with it on the north-west by Shap Fell, a ridge over 1000 feet in height, is the dome-shaped mass of the Cumbrian mountains, with its coalfield along the coast. Eastward, separated from the Pennines by the broad Vale of York, is the upland mass of the North York Moors.

South of the Aire-Craven faults and the Aire Gap, the Pennine divide becomes less marked, because it is narrower and lower. Rivers again flow mainly east and west, except in the south, where the chain dies down into the English plain in a series of finger-like projections. Here

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rivers like the Derwent flow north to south, and are collected by the Trent. The soft water collected by these rivers from the peat bogs and heather moors overlying the Millstone Grit, is a very important factor in the textile industries of Lancashire and Yorkshire. As in the north,

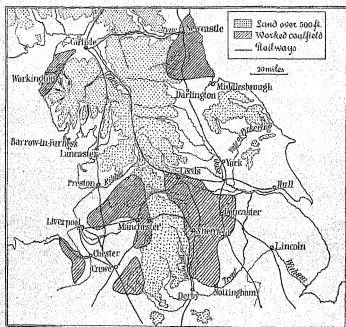


FIG. 37. THE NORTH OF ENGLAND

the western slope is steeper than the eastern, and since the plain on this side is narrower, the rivers are shorter and flow more quickly.

The general structure has already been explained. The limestone which forms the core of the Pennines is uncovered in two parts, in the north of the Craven area and to the south of the Peak. Surface streams are almost

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entirely absent in these parts, and the scenery is marked by dry valleys, gorges, and 'swallow-holes.' Water makes its way underground, forming caves. The important feature is that on both the eastern and western flanks the coal measures outcrop, and have been preserved from

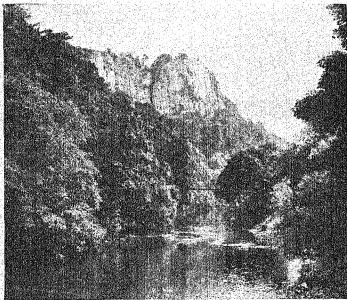


FIG. 38. HIGH TOR, MATLOCK

The narrow gorge in the Derwent valley.

By courtesy of the L.M.S. Railway

denudation on the lower ground by a covering of more recent rocks. But this is true only for the northern and southern sections. The central section has no such coal-fields. The three important coalfields are thus : (1) the Northumberland-Durham ; (2) Yorkshire-Derbyshire ; and (3) South Lancashire. These are all densely populated regions, while the Pennines, the Lake District, and the

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York Moors are inhabited only by isolated farms, and the spas of Harrogate, Buxton, and Matlock. The broad valleys and plains with newer rocks, notably the vales of York and Trent on the east, and the Fylde district of Lancashire on the west, are rich lands for farming and grazing.

The worked part of the Northumberland coalfield

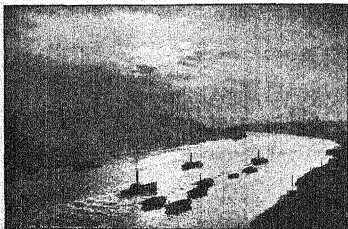


FIG. 39. TYNESIDE
Photo J. Valentine

covers 500 square miles. The Cleveland iron ore mines in the North York Moors, together with imported supplies from Spain and Sweden, enable the iron and steel industry to be carried on in all its branches. The North Yorkshire ores are now decreasing in importance. Tyneside ranks next to the Clyde in shipbuilding importance. Newcastle (283,000), near the head of the Tyne navigation, is the main centre, being a port, a great engineering town, and the business capital. Linked to Gateshead (122,000) by a splendid bridge, it is within easy reach of Wallsend (shipbuilding), of Tynemouth and North Shields (fishing)

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on the north bank; and of Jarrow (ironworks) and South Shields (shipbuilding and coal export) on the south bank. Subsidiary industries are chemicals, cement, pottery, brick, glass, paint, and saw-milling. To support its industries ores, timber, grain, and petroleum are imported.

Facing the Baltic countries, which are rich in iron, timber, and foodstuffs, but lacking in coal, the Tyne ports have an assured trade with these countries.

Farther north is the port of Blyth, exporting coal from some twenty pits within a radius of four miles, and engaged in some shipbuilding.

Southward, Sunderland (186,000), the bridge town of the Wear, has two hundred pits around it, and is another shipbuilding town, with foundries, and flour and paper-mills. The paper is made from imported esparto grass. The Hartlepoons make and export iron and steel goods. The ancient cathedral city of Durham stands on a rock site around which the river meanders. This strong position was important in the dangerous days of the vikings and the later Border warfare, but has hindered its development in times of peace.

The Tees estuary is not on the coalfield. Middlesbrough (138,000) and Stockton (68,000) use coal from the Durham field and iron from Cleveland and abroad for their iron and steel manufactures. These, together with cotton and woollen goods from Lancashire and Yorkshire, are exported to India and the East.

Separating this great industrial area from the West Riding coalfield of Yorkshire is the Vale of York, with the Ouse and its chief tributaries, the Swale, Ure, Nidd, Wharfe, Aire, Calder, and Don from the Pennines; and Derwent from the York Moors. Along this plain lies the great route to the North, through Northallerton and Darlington (L.N.E.R. depot). York (85,000) is the geometric and geographical centre. The minster, the castle, the city walls, the garrison, and the railway junction each reflects the importance of its position at the head of the

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navigation of the Ouse. The varied character of the glacial soils, the river gravels, and the alluvial deposits make the whole vale very fertile. More wheat is grown in the plains around York than in Scotland, Ireland, and Wales together. The Vale of Pickering is a distinct region, with a particularly rich soil. The vale was originally drained eastward to Filey Bay. But the valley became dammed by a glacial moraine, so that a lake was formed which overflowed in the south-west, where the river Derwent has cut a gorge. This old lake bed is now rich meadow land in the centre, with arable land around it, and market towns like Pickering and Malton are at the river openings leading to the vale. But the most used route runs to Scarborough and Whitby and other small havens which have grown into seaside resorts for industrial Yorkshire.

The Yorkshire-Derbyshire Coalfield. In the north is found the great concentration of the woollen industry. It originated because of the local supply of wool and the abundance of water. The coalfield and good communications with the ports of Hull and Liverpool have led to great specialization.

Bradford (298,000) is the chief centre of the woollen manufacture. Here most of the home and imported supply is combed and spun. Halifax (carpets), Huddersfield and Wakefield (worsted and blankets), Dewsbury, Batley, Morley (shoddy), and Barnsley (linen and paper) are other centres. But the commercial capital is Leeds (483,000), where also machinery and clothing are manufactured. Sheffield, to the south, is slightly larger (512,000), but its industries are steel in all its branches, and especially cutlery and armour plate. Lying at the junction of five valleys radiating from it like fingers from the palm of a hand, Sheffield is a commercial centre of its own. Here too water and the local stones, millstone grit, limestone, and ganister, have played an important part. East of Sheffield is Rotherham, a smaller Sheffield, and Don-

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caster, a locomotive centre, which is also fast becoming a great coalfield centre as the hidden coalfield around is developed.

A few miles to the south of Sheffield and Rotherham there is an active iron-smelting area, centring round Chesterfield and Staveley. Iron ore was found plentifully near the surface, but the supply is now more dependent on the iron-workings in Northampton and Lincolnshire.

In this part are the great commercial routes across the South Pennines. Besides the Leeds-Bradford-Skipton-Settle route through the Aire gap there are:

1. L.M.S. routes: (a) Manchester and Rochdale to Halifax (Littleborough tunnel, $1\frac{3}{4}$ miles); (b) Manchester to Huddersfield and Leeds *via* the Mersey and Calder valleys (Standedge tunnel $3\frac{1}{2}$ miles); (c) Manchester to Sheffield crossing the Derwent valley which runs north to south (Cowburn tunnel, 2 miles, and Totley tunnel, $3\frac{1}{2}$ miles).
2. L.N.E. route: Manchester to Sheffield, by the Mersey-Don valleys (Woodhead tunnel, 3 miles).

The South Lancashire Coalfield. This also has a highly specialized industry. Facing America and the West Indies, the main source of raw cotton, occupying a flat plain open to the moisture-laden winds from the sea, and having abundant water from the Pennines for power, dyeing, and bleaching, this district was naturally the place in England where cotton was first spun and woven. At first the industry was carried on in the home by a people accustomed to handling wool. When machinery necessitated coal, coal was there at hand. Development of railways, roads, and canals was easy, and by the Ship Canal Manchester became an ocean port. A damp atmosphere is necessary for cotton manufacture, but, although Lancashire generally has this, the conditions are now produced artificially in the mills.

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The traditional skill of the population in a long-established industry must not be overlooked as a factor con-

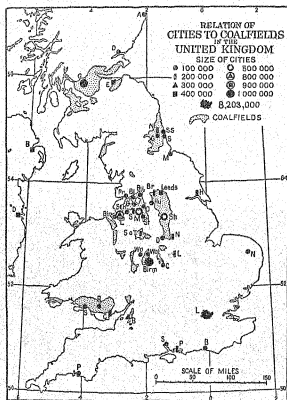


FIG. 40. RELATION OF CITIES TO COALFIELDS

From "The New World: Problems in Political Geography," by Isaiah Bowman (The World Book Company, Youkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

tributing to the persistence of this industry, or any other, in the region where it has grown.

Manchester and Liverpool are rival commercial capitals of Lancashire. Manchester (766,000) and Salford (223,000)

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stand encircled on the north, east, and south by the Pennines and a corresponding arc of towns, Macclesfield (silk), Stockport, Oldham, Rochdale, Bury, Bolton, Wigan, and St Helens. As in Yorkshire, many of these towns merge into each other, while farther north are Burnley, Blackburn, and Preston.

Factories specialize in particular branches of the manufacture. Spinning is the chief process performed at Oldham and Bolton; bleaching at Bolton and Bury; weaving at Preston, Blackburn, and Burnley; machinery-making at Manchester, Oldham, Bolton, and Bury. Wigan supplies coal and smelts iron; Widnes and St Helens make dyes and chemicals. The chief market for raw cotton is Liverpool, although considerable quantities of cotton, especially Egyptian, are landed direct at Manchester. Manchester even rivals Hull as a port for sea-going ships. Besides cotton, many kinds of other goods are unloaded at Manchester docks—grain, meat, foodstuffs, timber, fruits, tobacco, and even wool and iron ore. Its exports include cutlery, electrical equipment from Yorkshire and the Midlands, as well as the products of Lancashire.

The position of Manchester makes it a very convenient centre for receiving and distributing cotton goods at different stages of manufacture. Here, too, are concentrated the offices, warehouses, and the Cotton Exchange.

It is interesting to note that the Yorkshire boundary comes well down on the western side of the Pennines; for example, in the Ribble valley. Here the cotton and woollen industries intermingle, Rochdale making both flannels and flannelettes (cotton only), and Bury making and bleaching blankets.

Liverpool is second to London as a port. In addition to its American trade, it is a port for shipping from the Mediterranean and India, Africa, Australia, and the Far East. Its imports, therefore, have a wide range—raw cotton, wheat, timber, sugar, fruit, rice, cacao, meat, rubber, and vegetable oils. Its exports are mainly

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textile goods of all kinds, machinery, and general manufactures.

Liverpool (856,000) and Birkenhead (148,000), on opposite sides of the bottle-neck entrance to the Mersey estuary, are really one town. Shipbuilding and engineering are carried on in both. There is a wide range of other industries along Merseyside, for the site has advantages of both ocean-going and inland traffic. Flour, sugar, oils, and tobacco are examples of raw materials prepared for marketing.

One of the important industries of Lancashire is paper-making, which is a widespread manufacture in Great Britain. The county contains more paper-mills than any other. There is a big demand for paper in the cotton trade. Cotton goods have to be made up and packed to meet the varying demands of foreign countries in all parts of the world. Water-supply, coal, ports, and a ready market account for this development of paper-making. Manchester and Preston import wood-pulp from Scandinavia. Paper is made at Darwen, Bury, and Bolton. But the demand is met only by supplementing local supplies of paper with imported supplies.

The pleasure resorts are Blackpool, Southport, Douglas (Isle of Man), and many North Wales havens. Fleetwood has a fishing industry and Heysham passenger traffic with Ireland.

The Lake District is a mass of old sedimentary rocks, with many igneous rocks exposed. These old rocks have been worn down, depressed, covered with newer rocks, and again uplifted and folded. The existing mountain mass resembles a great dome. The forces of erosion, especially running water and in past ages ice action, have carved it out into spurs and valleys, which radiate from this centre, or, to be more exact, from a central axis.

The way in which the exposed rocks of the central mass have been folded, twisted, and fractured is evidence of this complicated geological history. Around the margins

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are the remains of the former arch of younger rocks. These consist of the Carboniferous rocks, including coal measures in the north-west, but limestone only in the north-east and south. The striking contrasts of scenery are due to this varied structure. Mountain slopes are smooth and rounded where grits and shales occur, rugged and wild where volcanic rocks are exposed, tabular on the dry limestones, and rolling on the coal measures. The dome is cut into eastern and western masses by the fault valleys, followed by the road linking Kendal and Keswick. The highest points are Scafell Pike (3210 feet) in the west, Helvellyn (3118 feet) in the east. In the north of the region stands Skiddaw (3054 feet), separated from the Helvellyn group by another fault valley.

The district is subject to much cloud and heavy rainfall. The mountains are mostly grass-covered, but afforestation is being carried out in places. The steep, high mountains, with high passes between them, the wooded lower slopes, and the many glacial lakes make it a most attractive region. In summer, when the bracken and trees are in leaf, the dominant colours are greens of different shades. But from October to the following June, the sienna tints of the dead bracken and the brown oak-leaves enhance the colours of the lichen-covered rocks and the hazel and birch trees. Sheep-farming and catering for tourists provide the main occupations. The chief lakes are:

1. To the north, Derwent Water and Bassenthwaite, separated from each other by the delta which the river Derwent built out across the lake. Near the delta stands Keswick, the chief centre on the northern side. Other notable lakes are Buttermere, Crummock Water, and Ennerdale.
2. To the south, Thirlmere, which supplies water to Manchester, Ullswater, Windermere (with Ambleside at the head of the lake, as the chief tourist

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centre on the south), Grasmere, Rydal Water, Coniston Water, and Wast Water.

Separating the Lake District from the Pennines is the deep Eden valley, providing a good route from Scotland and Carlisle to the south. This tongue of red Triassic



FIG. 41. LANGDALE PIKES (2400 FEET), SIX MILES NORTH-WEST OF LAKE WINDERMERE

By courtesy of the L.M.S. Railway

rocks is the best farming land in the area for oats, roots, potatoes, and hay. From Lancashire the railway keeps close to the coast, then passes to Kendal over the Shap shoulder (1000 feet), between the lake region and the Pennines, to Penrith and Carlisle. To the east another L.M.S. line crosses the western spurs of the Pennines from the south and passes by the Eden valley to Appleby and Carlisle. On the west coast of this region is the coal-

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mining district, with Whitehaven, Workington, and Maryport. Near Whitehaven are also mines of high-quality hæmatite ore. To the south lies the busy iron district of Furness, to which the above ports send coal for smelting. Barrow builds ships, but much of the smelting is done at the coal ports, which import iron and manganese ores from Spain, in addition to local supplies.

The Isle of Man, equidistant between England and Ireland, is geologically like the Lake District or Wales, and has slate-quarries and lead- and copper-mines. Much of the land is cultivated, for the rainfall is not too heavy. Oats are the chief crop. It is a great holiday resort, with Douglas as the port.

The Midlands. Occupying a central position between the south of the Pennines, the Welsh uplands, and the limestone escarpment which crosses central England is the city of Birmingham, which is the business capital of the Midlands. Round it spreads a fertile area covered with New Red Sandstone. Underlying this sandstone, and occasionally appearing through it, are coal measures. They account for the coalfields of North Staffordshire, South Staffordshire or Cannock Chase (the Black Country), Warwickshire, and Charnwood Forest (Leicestershire), while westward, in the valley of the Severn there are the mid-Severn area, the Wyre Forest, and other small fields.

North Staffordshire is the home of the pottery industry. The local clays and coal determined the establishment of the industry here. Local clays are used chiefly for earthenware, pipes, and tiles. Gypsum from near Derby, chert from the Peak and Flintshire, and flints from the chalk hills in the south are also used. For finer pottery, kaolin is imported from Cornwall and Devon through the Mersey ports by canals. The county borough of Stoke (277,000) is composed of six original pottery towns. Newcastle-under-Lyme is an old market town, proud of its history, and not a pottery town. But, although separate, it is in reality a residential suburb of the county borough.

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On the South Staffordshire coalfield or in the Black Country iron-smelting by means of charcoal began before coal was used. Towns such as Wolverhampton (iron and railway plant), West Bromwich (cables, anchors, etc.), Walsall (chains), Dudley (glass and nails), and others are crowded on the coalfield. 'Blackband' iron ore is good smelting ore, but local supplies are now worked out. The number of furnaces in blast has considerably declined since the War, but the iron and steel industries continue. Smoke, so destructive to plant life, and ugly tip-heaps have given the district its name. Metal and other goods, which fetch a high price in proportion to their bulk, such as machinery parts, watches, wireless apparatus, jewellery, cycles, screws, brass-ware, artificial silk, etc., are made. Birmingham is the distributing centre of the Midlands. The distance to the ports of Liverpool, London, Bristol, and Hull, which varies from fifty to eighty miles, has been a handicap to the area, and has affected its development. Canals have therefore played a great part in transport. They link Birmingham to Wolverhampton, to the coalfields, and to the ports, but are now used chiefly for local trade. The numerous locks and long tunnels, which were necessary to overcome the differences of level, prove the value attached to them.

Birmingham (1,002,000) stands at the junction of the county boundaries of Stafford, Warwick, and Worcester. It is near, but not on, the coalfield. It stands high on a plateau, the approach to which is marked by the steep railway gradient of the Lickey incline (one in thirty-seven) on the L.M.S. line from Bristol. Coventry (167,000), the chief town of the Warwickshire coalfield, began the making of cycles and motor-cars. Its importance is somewhat dwarfed by that of Birmingham. The small Leicestershire coalfield supports few industries. Beyond this industrial area in the valleys of the Avon, Severn, and Trent are some of the oldest and richest pastures of England with their cathedral towns.

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To the north-east of this midland industrial area lies the upper Trent basin. The tributaries of the Trent follow north-south valleys, the Derwent and its tributary the Wye, providing a route across the south-west Pennines, through Buxton to Manchester; the Soar and the Tame, routes from the south and west. At Derby (142,000), on the Derwent, the L.M.S. depot and Rolls-Royce motor-car works mark its importance as the focus of routes. Other important railway junctions are Stafford, Rugby, and Trent Junction. Leicester lies practically on the straight line joining London and Manchester. Nottingham marks a good crossing of the Trent, but through routes keep either to the east, where Ermine Street followed the drier ground through Grantham and Lincoln, or to the west, through Trent Junction to Derby and Sheffield. The industries of the county towns Leicester, Nottingham, Derby, and Stafford show that (i) agriculture, (ii) water-supply, (iii) coal, and (iv) easy communication combine to influence human activities. (i) The marls of the plain provide rich soil for farming and market-gardening, and for pastures. The cattle supply milk in large quantities to Leicester, Nottingham, and London. The oaks of Sherwood Forest facilitate the tanning of hides. The Leicester breed of sheep, introduced by Bakewell in the eighteenth century, increased the importance of wool. (ii) The ancient rocks of Charnwood Forest contain steep-sided valleys, easily dammed to provide reservoirs for the cities; and the beds of gypsum round Buxton and Nottingham give the waters the hard quality so suitable for brewing. (iii) The great coalfield to the north of Nottingham supplies abundant power for manufactures, and the Leicester field to the west of Charnwood, an area confined to mining, supplies excellent household coal. Leicester (239,000) largely controls the boot and shoe and woollen hosiery industries of the country. The complicated machinery required for both industries is made locally. Nottingham (269,000) specializes in lace and hosiery.

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The iron industry, which dates from the days of charcoal, has developed into the modern motor, machinery, and cycle industries. Both cities are great market towns and distributing centres. Stafford (29,000), on a tributary of the Trent, midway between the Potteries and the Black Country, is important as a route centre and market town, manufacturing boots and shoes.

The Scarplands. To the south, extending from Portland to the coast of North Yorkshire, are the scarped limestone uplands. Its sections are known as the Cotswolds, Edge Hill, Northampton Hills, Lincoln Edge, and North York Moors. The western face of this escarpment has been unequally eroded, so that the ridge is irregular and broken by many transverse valleys. Many of the valleys, though evidently cut by running water, are now dry, as the streams have been beheaded by others flowing at right angles. Some valleys, also, are caused by subsidence following under-solution and erosion along the faults in the rocks. Empty valleys are sometimes called wind gaps. Railways and roads follow the gaps as far as possible, but tunnels are necessary, particularly through the Cotswolds, where the hills are highest; for example, Box (2 miles), and Chipping Sodbury (2½ miles).

The limestone of the south-west section of the oolitic hills is easily cut in any direction; and is valuable for building. It has been used in building several of the cathedrals. Stone walls and slab-roofed houses are a feature of the area. Iron ore forms another source of wealth at several places; for example, Westbury (Wilts), Kettering, and Wellingborough. At Scunthorpe, in Lincolnshire, active iron foundries have arisen, using coal from the West Riding of Yorkshire. The Cleveland hills contain valuable iron ore, on which the Middlesbrough iron industry was founded. The uplands are still used chiefly for sheep-farming. Woollen industries are carried on in towns along the foot of the hills; for example, at Stroud, Bradford-on-Avon, Trowbridge, and Witney.

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The clay vale under which the limestone dips was originally forested and swampy. The wave-like formation

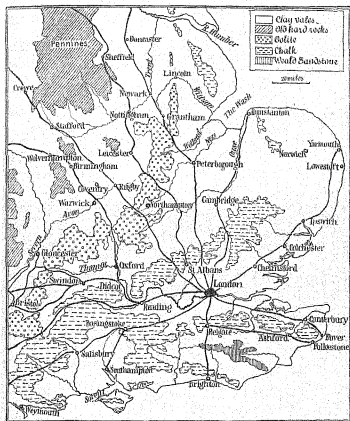


FIG. 42. THE MIDLANDS AND SCARPLANDS

of many fields to-day is evidence that in medieval times it was extensively ploughed for wheat. But cattle pasture now claims a large part, so that this belt of country is still rural, although in many of the market towns

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industries have sprung up. In this rich and prosperous plain were planted the universities of Oxford (80,000) and Cambridge (67,000). In the cattle county of Northampton the leather- and boot-making industries are carried on at Northampton (92,000), Wellingborough, Kettering, and several other places. Motor-cars are made near Oxford, railway plant at Swindon (G.W.) and Wolverhampton (L.M.S.), bricks at Peterborough. Agricultural implements are made and flour-milling is carried on at Bedford, Huntingdon, and other places.

The chalk hills run almost parallel to the limestone ridge. The Wiltshire Downs, Chiltern Hills, East Anglian Heights, Lincoln Wolds, and York Wolds are the sections of the main escarpment.

In the south, earth movements have acted upon the tilted strata to throw up several anticlines and synclines whose axes run east-west. In the west of this area there is a larger anticline in the north (the Hampshire Downs, etc.), and a minor one in the south (Purbeck Downs), partly drowned by the sea, with the Hampshire basin, also partly invaded by the sea, between them. In the area of Salisbury Plain the arch of chalk is still complete, although weathered into rolling ridges and vales. In the east the North and South Downs, truncated by the sea at the South Foreland and Beachy Head respectively, turn their steep faces to the low plain of the Weald, which was formed by the erosion of this anticline. The London basin is a syncline filled by later rocks.

The Isle of Wight is a fragment cut off, both on the east and the west, by drowning. The sea has carved out sweeping bays in the softer strata thus exposed, and piled up beaches against the projecting promontories, and 'bills' of the harder strata. Lulworth Cove is an example of a chalk ridge cut through by erosion. Southampton Water is an old drowned valley which the double tide has scoured deep, but some of the subsided plains, like Poole Harbour, collect large quantities of mud and silt.

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The Chilterns have many wind gaps, which form convenient routes. The chief water gap is that cut by the Thames. There seems little possible doubt that the Thames is the consequent river which originally followed the natural slope to the south-east, and at one time carried also the waters of the Severn. The Thames has captured many other of the original streams. By the cutting back of the subsequent tributary of the Lower Severn in softer



FIG. 43. LUTWORTH COVE

rocks the Thames lost much water. This explains the deep, wide gap and the relatively small river through the chalk between Wallingford and Reading.

Sheep graze on the upper slopes of the Chilterns. The beech-woods scattered about the lower slopes give rise to chair-making at High Wycombe and wood-carving at Berkhamstead. Formerly wheat was extensively cultivated on the south-eastern slopes, so that hat-making industries from straw-plait grew up at Dunstable, Luton, St Albans, and other places. The industry continues at Luton, largely with imported straw-plait. Other industries, including light engineering, paper-making, printing, etc., are dependent on imported raw material. Barley is now widely grown for brewing round Watford. The water of the river Colne coming from the chalk hills has a suitable hardness.

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Between the Chilterns and the North Downs the chalk dips under the clays of the London basin, across which flows the lower Thames. For modern transport the whole region is influenced by London, most of it being within an hour's journey. Much of the area is devoted to market-gardening. But City workers increasingly tend to make their homes outside London, and factories of all kinds have been built beyond the boundaries to escape the high costs of London itself. The cathedral town of St Albans stands outside this populated ring of London suburbs. Eton, Harrow, and Mill Hill, with their public schools, lie on the fringe of it, while up the Thames valley, at the junction with the Kennet, stands Reading. This is an important market and railway centre, both as a junction and a depot. Its university is specially equipped for agricultural science. Seed-growing and biscuit factories also indicate the importance of Reading as a focus for the agriculture of the valley.

London (8,203,000), is the first city of the world. Its site must, therefore, be considered in relation to its world interests. The advantages possessed by the British Isles as a whole stated at the beginning of this chapter apply with particular force to London. Looked at more closely, it is the centre of a sixty-mile circle, which has on or near its circumference Harwich, Dover, Portsmouth, Southampton, Swindon, Rugby, and Peterborough.

London is built at the lowest point on the Thames, where both banks rise well above the marshes. This is sixty miles from the open sea. The Romans built a bridge near where London Bridge now stands, and soon roads radiated from it as both roads and railways do to-day. The city walls which they built enclose an unusually large area, and this indicates its early importance. Trade has always been the foundation of its greatness. Out of its trade, its port, and factories, which mostly cluster round the docks to the east of the City, have developed its wider importance as a city of banks and offices, as

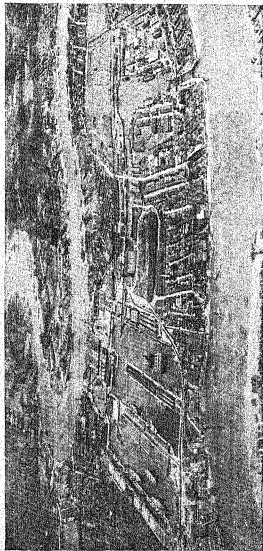


FIG. 44. LONDON: AN AERIAL VIEW OF DOCKLAND
By courtesy of the Port of London Authority

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the home of our Parliament and High Courts of Justice, as a university centre and the headquarters of every form of national life.

Docks began to be built in London in the eighteenth century. The river meanders and the clay soil were helpful in dock development. In 1800 the West India Dock was built, and by 1806 the East India Dock. These docks were owned by companies which had a monopoly of trade from those parts of the world from which the docks took their names. Along the riversides, in addition, were wharves, quays, and storehouses. Other docks rapidly followed, all built by companies. But in 1908 all the docks were taken over by Act of Parliament, and the Port of London Authority now manages the whole. The docks can warehouse over a million tons of goods, and there are many miles of quays. Over one thousand vessels of all descriptions pass Gravesend every day. The Royal Victoria, Royal Albert, and King George V Docks comprise the largest sheet of enclosed dock water in the world.

Over 20,000,000 tons of merchandise enter the port every year. The following are some of the chief commodities:

Grain	2,000,000 tons	Apples and	
Wood	1,500,000 "	oranges	6,000,000 bushels
Meat	63,0000 "	Wines and	
Paper and pulp	750,000 "	spirits	8,000,000 gallons
Sugar	680,000 "	Tea	430,000,000 lb.
Provisions	400,000 "	Rubber	156,000,000 "
Tallow oils	293,000 "	Carpets stored in	
Iron and metals	282,000 "	warehouses	1,000,000 sq. yds.
Wool	1,300,000 bales		

The business of storing goods pending their redistribution to other countries, called *entrepôt* trade, is very important. The following are the chief materials dealt with in this way:

Wool from Australia, New Zealand, South Africa, India, and Argentina, re-exported to Germany, the United States, France, and Belgium.

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Rubber from Malay, Ceylon, and Brazil, re-exported to the United States and Europe.

Skins and hides from Argentina, Australia, and New Zealand, re-exported to the United States.

Jute from India, re-exported to the United States, Brazil, and Germany.

London is, therefore, not only the world's largest port, but the market and financial centre of the world. It serves within a radius of ten miles of the docks a population of over eight million, and within a hundred miles over sixteen million. The problems of water-supply and sewage disposal for such a huge population have been solved only by great engineering developments. The water-supply comes mainly from the Thames and Lea, being purified and stored in vast reservoirs on the plain. Not only do buyers and sellers from all over the world meet at London, but millions of people visit it every year.

As all the main railway routes focus upon London, other ports are linked with it, but in particular passenger traffic across the narrow seas to and from London is conducted by a group of outports:

Harwich (north of estuary) to the Hook, 106 miles; to Zeebrugge, 90 miles; to Antwerp, 135 miles; to Flushing, 100 miles; to Esbjerg, 337 miles.
Dover to Ostend, 68 miles; and to Calais, 22 miles.
Folkestone to Boulogne, 26 miles; to Dunkirk, 53 miles.
Newhaven to Dieppe, 67 miles.
Southampton to Le Havre, 112 miles.

The increase in the size of ships has led to extension downstream of docks and wharves. The new Tilbury landing-stage enables the largest liners to berth there. Similarly, population is spreading eastward into Essex; but the low levels have made the problems of water-supply and sewage disposal difficult. Another difficulty is the

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increase in the width of the estuary, which hinders communication between the two shores.

Along the Essex shore, where low cliffs rise above the

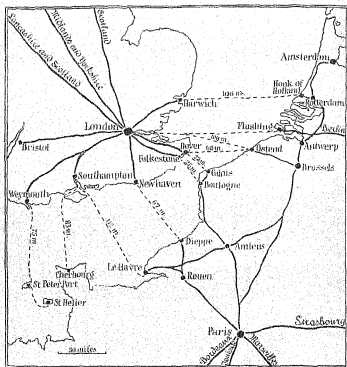


FIG. 45. LONDON: ROUTES ACROSS THE NARROW SEAS

drowned valleys and creeks, are seaside resorts—Southend and Westcliff, Clacton and Walton—and at the head of the creeks market towns like Ipswich, Colchester, and Maldon. On the Kent shore opposite, the coast is higher and towns more frequent. Whitstable, Herne Bay, Margate, and Ramsgate are holiday resorts, and Chatham,

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Gillingham, and Rochester together serve as a base for defence.

The industries of London are so varied that their importance is often overlooked. Facilities for transport by road, as well as by rail and water, and the electrification of industry, have led to a great increase in the number of factories in and around London. They are built chiefly along the lines of the railways, the arterial roads, and the riverside, as well as in low-lying areas, which until recently were deemed unsuitable for dwelling-houses. In addition to the electrical and engineering works, saw-mills, tanneries, and the factories making soap, brushes, and chemicals found in close proximity to the docks, light engineering in all its branches and the making of furniture, textiles, and foodstuffs, railway plant, and miscellaneous articles of all kinds is extensively carried on.

East-Anglia offers many contrasts to the west. Geologically it is young, while the west is old. It is a land of low relief and smooth coasts, and lies close to London and the active regions of the Continent. Again, for centuries it was not only agricultural, but had prosperous woollen industries. It has had to adapt itself to new and changing conditions. It is now pre-eminently an agricultural region, but its former greatness in the making of textile goods is finding new modes of expression in pure and artificial silk factories, and there are other industries in iron, leather, and agricultural products. The grid system of distributing electrical power will encourage manufacturing industries in this area. The absence of water-power was a handicap in the past, and there is none available for producing electricity, which will be otherwise produced and transmitted from a distance. Indeed, the supply of water for consumption becomes more difficult as the population grows.

The eastern counties have the highest yield of wheat. Cambridgeshire, Hertfordshire, Essex, Norfolk, Suffolk, and Lincolnshire yield over 500 quarters per 1000 acres of

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cultivated land. The chief factors which favour the cultivation of cereals are the deep, rich soils, abundant river-water, light rainfall, and abundance of sun at the harvest time; and the rolling type of country facilitates the use of machinery. For manuring the land the farmers rely more upon bullocks than sheep. Barley—grown mostly east of the wheat area—oats, sugar-beet, root-crops, potatoes, and mustard are also grown in large quantities. Root crops play a particularly important part in the rotation of crops required for the soils. The root crops also provide winter foods for cattle and sheep. Several towns make agricultural machinery; for example, Ipswich, Norwich, Peterborough, Gainsborough, Grantham, and Lincoln. It proves cheaper to construct this heavy machinery on the spot than to transport it from the north, and the numerous estuaries and creeks provide water transport. Norwich also makes starch from potatoes, and mustard. Milling is an important industry in most of these towns. The numerous abandoned windmills are an expression of this occupation.

Lincoln and Norwich are each great route centres for their respective areas. The imposing cathedrals and numerous fine churches in each of these centres remind us of the wealth won from the wool-trade. Lincoln (66,000) stands by the Witham gap. Norwich (126,000), once the great wool-market of Britain, is the focus of all activities in its county. Along the east coast south of the Humber are many holiday towns—Cleethorpes, Skegness, Hunstanton, Cromer, and Felixstowe. Yarmouth and Lowestoft are both holiday resorts and important fishing ports, with large fish-curing and packing industries.

The Humber ports, Hull and Grimsby, are the most important fishing ports. Hull (313,000), on the northern bank of the Humber, also imports from the East more oil-seeds than any other port. Crushing, refining, margarine- and paint-making are resultant industries. From Scandinavia and the Baltic countries come timber and

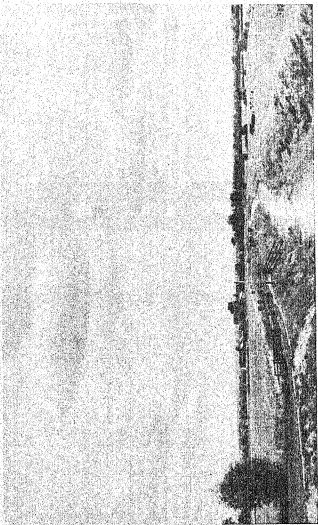


FIG. 46. FENLAND NEAR CAMBRIDGE

Photo G. E. Briggs. Reproduced by courtesy of the "Kodak Magazine"

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iron ore, grain, flour, and dairy produce; wool, hides, and skins from Australia; wines and fruits from the Mediterranean; tea from India; meat, maize, wool, and wheat from Argentina; and petroleum from the United States. Its other industries include flour-milling, furniture-making, leather-tanning, agricultural machinery manufacture, and shipbuilding. On the southern bank are Immingham, Grimsby, and Goole. Goole, fifty miles from the sea, is chiefly important for its canal connexion with Leeds, by the Aire and Calder Canal, and with Doncaster and Sheffield. Heavy castings travel more easily by canal than by road or railway. Immingham has deep-water approach, and is an important port for coal and iron. Grimsby (92,000) also exports textiles, fish, coal, and iron, and imports timber.

Boston and King's Lynn are small ports that now have little trade, for the Wash is too shallow for large vessels.

The lower basins of the Witham, Welland, Nen, and Ouse form an area of about 1500 square miles, known as the Fens. Probably a river originally flowed north-eastward, cutting its way through the chalk. Its flood plain was later invaded by the ice-sheet, bringing boulder clays. Subsidence of the land also reduced the erosive power of the rivers and caused the deposit of alluvium; and the tides of the North Sea have assisted by depositing muds and gravels, which are slowly but steadily filling the Wash. The occupations of fishing, peat-cutting, and the hunting of wild birds have only slowly given place to farming. Crops are varied: wheat, oats, potatoes, and fruit are the chief, but sugar-beet cultivation is spreading. Wisbech is the chief fruit-market, with jam-making as an industry. Round Spalding there is a flourishing bulb industry. The lack of building material is met by bricks made at Peterborough. Ely, with its cathedral, has grown on a firm island of boulder clay.

Southern England. The country intervening between London and the south coast was once heavily forested.

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In past geological ages chalk rocks formed a complete arch between the North and South Downs. But weathering has removed the crown of the arch, so that only its bases remain as escarpments, which face each other as the North and South Downs. Underlying rocks thus exposed have weathered unequally, the clay forming deep, broad valleys and the sandstone upstanding as a central axis of hills. Rivers originally flowed from the crest to the north and south. The valleys they cut through the

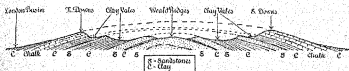


FIG. 47. SECTION FROM NORTH TO SOUTH ACROSS THE WEALD

lower edge of the chalk have allowed them to maintain their courses, and afford north and south routes. Note the chief gaps and their towns, which are built as a rule along the line of springs that emerge at the junction of the chalk and clay.

North Downs		South Downs	
<i>Gap Town</i>	<i>River</i>	<i>Gap Town</i>	<i>River</i>
Ashford	Stour	Arundel	Arun
Maidstone	Medway	Lewes	Ouse
Sevenoaks	Darent		
Reigate	'Wind gap'		
Dorking	Mole		
Guildford	Wey		

These and other gaps are used by railways between London, Brighton, Newhaven, Eastbourne, Hastings, Folkestone, and Dover. All these towns are also popular holiday resorts. The Kent peninsula has been the highway to the Continent from the earliest days of man. The ancient trackway known as the Pilgrims' Way, along the 'causeway' of the North Downs, leads to Stonehenge and

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Salisbury Plain. The Romans built Watling Street from Dover, through Canterbury, along the northern foot of the Downs, to London. To-day the air route follows the southern side of the Downs to Croydon. The many ports and havens prove the need of alternative landing-places, and Canterbury was the collecting point of the routes. The sunny climate of this peninsula of Kent, Surrey, and Sussex suits fruit and garden produce (*cf.* Lake Peninsula of Canada, Nova Scotia, and Devon). The orchards and hop-gardens lie along the southward sloping plain of the Stour.

Agriculture closely follows the series of geological outcrops. Going from north to south, we find pastures on the alluvium for fattening sheep and cattle; sheep on the London clay; rich agriculture, fruit, hops, and dairy-farming on the lower chalk slopes; chiefly grass on the chalk heights; another arable and fruit belt along the lower slopes of the escarpment; dairy cattle on the Gault clay; rich cultivation, including fruit and hops, on the Lower Greensand; meadows, wheat, and roots on the Weald clay; and poor agriculture, mainly grass, on the sandstones of the interior.

In the same way towns and villages cluster along the edges of the outcrops, particularly in the river valleys. Thus Rochester, Chatham, and Gillingham, with a combined population of 135,000, form a little London on the Medway. Coal, iron, and timber are imported for engineering and shipbuilding trades, and cement is the largest export. Rochester makes the familiar steamroller, Maidstone makes motor-buses, and Ashford, on the Stour, locomotives. Varied industries, dependent on agriculture, such as milling, brewing, and implement-making, are widespread in the market towns. Other industries concerned with the utilization of geological formations—for example, stonework, brickmaking, and lime-burning for cement—are carried on where the product is worked.

The three counties, Surrey, Kent, Sussex, meet on the

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sandstone hills in the centre, with Crowborough Beacon as the highest point, and Tunbridge Wells (35,000) the chief town and spa. The grassy expanse of Romney Marsh provides pasture for sheep, but wheat is grown on the drier areas, and cattle are grazed in some parts. But the levels around Pevensey is the chief cattle-grazing area along this coast.

The Hampshire Basin. This is comparable in structure with the London basin. Water-supply is again a dominant factor in agriculture and settlement. The valleys provide good permanent pasture, the lower clay and sandy slopes produce fodder, root crops, and wheat, and the chalk downland is devoted to sheep pasture. Sheep are fed at different seasons at both altitudes, and are a necessary factor in the rotation of crops. Wool has always been a staple product, although periodically grain-growing increases under stimulus of high prices. But the area is more suited to the pastoral productions of wool, meat, and milk. These serve to keep the rural population in constant touch with distant markets. Otherwise the area would be rather isolated, for traffic is mainly across it, between London and the ports and seaside towns. Orchards and small-holdings, on which are grown garden produce, vegetables, fruits, and flowers, are increasing along the south in the hinterland of the coast towns.

The basin is well-wooded still, and was, no doubt, at one time thickly forested. Woodlands of beech and pine occur on the drier slopes, firs and oaks on the cappings of clay and flints overlying the chalk. Acorns and beech-mast provide food for pigs. The bacon of Wiltshire and Hampshire is famous.

The two chief inland towns are the market towns of Salisbury and Winchester. Both are at the junction of valley routes from the outer rim of chalk to the port of Southampton. Winchester (13,000) for a time displaced London as the capital when wool was the staple of trade. Salisbury (26,000), with its spired cathedral, is

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the chief Wiltshire town. In the higher valleys stand Wilton, to the west of Salisbury; Andover, and Whitechurch, to the north of Winchester. The other towns are either gap towns, like Basingstoke and Warminster, or are built along the line of water-yielding strata, as at Dorchester, Wimborne, and Chichester.

Aldershot, on the edge nearest to London, is a great Army training ground. The porous soil makes it quick drying, and the rolling and wooded country is excellent for manœuvres. Salisbury Plain is another military area, while on the south coast where the chalk hills overlook a large land-locked harbour, is the important naval station of Portsmouth (249,000). Along the coast where cliffs occur are many holiday resorts. Bournemouth (117,000) is the largest of these resorts. The Isle of Wight, with Cowes—the Royal yachting centre—Ryde, Ventnor, Shanklin, and Sandown, attracts many visitors. Farther west is Weymouth, with its naval harbour, sheltering under the lee of Portland. It is also a holiday resort and a port for the Channel Islands.

Southampton (176,000) has a splendid natural harbour, which is used by the world's largest and fastest liners, so that it is the chief passenger port of Britain. Sheltered by the Isle of Wight, and with four high tides a day (two by Solent and two two hours later from Spithead), it has a depth of water which enables large vessels to reach port at any time. Southampton is really an outport of London, for it has no industrial area behind it. Being within easy reach of the main line from London to Plymouth, and close to the Army training areas, it has also great military importance. Southampton is favourably placed for shipping to the west of Europe, Africa, the Mediterranean countries, and the East, Australia, and South America, but liners from North American ports use it also. Its imports include, therefore, all kinds of foodstuffs and perishable goods. Canary bananas are imported, together with fruits, wine, and cork from Southern Europe; grain and cotton

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from Mediterranean countries; wool, hides, skins, and feathers from South Africa; tea, rice, jute, and vegetable products from India and Malay; and wheat, wool, meat, timber, and skins from Australasia. It exports machinery, hardware, and general manufactures. Its importance as the port at the confluence of rivers and as the centre of the Hampshire basin must not be overlooked.

The West of England. Worcestershire, Gloucestershire, and Herefordshire occupy the lower basin of the Severn, which geologically is an extension of the New Red Sandstone of the Midlands. The Severn, rising near Plynlimmon, has after leaving Wales many meanders in the plains of Shropshire; but it then passes through a gorge in south Shropshire into the plains of Worcestershire, and so on to Gloucester, below which its estuary broadens into a great arm of the sea. Shrewsbury, built near its most northerly point (*cf.* Orléans), is an important centre for Wales as well as for Shropshire. The castle, railway junction, market, and school illustrate this fact. In the south of Shropshire, and extending into Herefordshire, there is a complicated series of ancient, folded, and faulted hills which trend north-south; for example, Wenlock Edge and Malvern Hills. These western counties are all famous for their breeds of cattle. The mild, moist, yet sunny climate also suits fruit. The counties of Hereford, Worcester, Somerset, and Devon produce the largest quantities of apples and pears. The Vale of Evesham, in Worcestershire, is especially famous for fruit, particularly plums. Small fruits—strawberries, etc.—flourish throughout the western counties in suitable positions, and hops in the counties of Hereford and Worcester. There are several cathedrals built of oolitic limestone, which are evidence of the historical importance and wealth of the area in earlier times. Stratford-on-Avon, Cheltenham, and Leamington, on account of their sheltered positions and picturesque surroundings, attract many visitors.

Gloucester (53,000), the historic cathedral city at the

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lowest road crossing of the Severn, is the natural focus of land and water routes. A ship canal between Sharpness and Gloucester enables 800-ton vessels to reach the latter. Canals facilitate barge traffic with Worcester and Birmingham. The industries include iron, leather, and cloth, each of which began centuries ago. The construction of the Severn Tunnel and of the railway bridge at Sharpness has deflected traffic from the South Wales coalfield in favour of the rival city of Bristol.

Near the large towns intensive agriculture, market-gardening, and milk production play an important part in the lives of the people.

The Bristol Avon is a remarkable river. Rising on the eastern slopes of the Cotswolds, it flows first eastward as a consequent river as though to join the Thames. But, turning first southward and then westward, it cuts its way through the oolite at Bath, and finally flows north-westward through a second gorge in the Clifton Downs, near Bristol.

On the borders of Somerset and Gloucester is the port of Bristol (397,000). It was from Bristol that Cabot sailed to America, and Bristol has maintained its hold on American and Irish trade by the creation of modern docks at Avonmouth and Portishead, but ships of considerable size still come through the Avon gorge to Bristol itself. Its import trade is associated with fruits, grain, meat, provisions, timber, oil, and tobacco. Bananas are a special feature, with ships and trains reserved for this trade. Over a quarter of the tobacco imported into Britain enters through Bristol—viz., over 20,000 tons. Iron and steel goods form 50 per cent. of its exports. Bristol has, within fifty miles, a population of 3,000,000, and within 100 miles 11,000,000. Linked to London and the west by the G.W.R., and to the north by the L.M.S., it also has inland waterways to Birmingham and the Midlands and to Bath. Near at hand, on the Mendips, and across the Channel in South Wales, it has a ready

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supply of coal. Its industries include tobacco, rolling-stock, aircraft manufacture, as well as chocolate and cocoa.

Twelve miles east of Bristol lies hill-encircled Bath



FIG. 48. CHEDDAR GORGE

(69,000), a city famous since Roman times for its hot mineral springs. The quarrying of oolitic limestone is important locally. On the other side of the Mendip Hills lies the small but picturesque cathedral city of Wells.

The Mendip Hills, which run practically east-west across the north of Somerset, are composed mainly of

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old limestone rock. Structurally they consist of an up-fold first planed down and then uplifted, so that it is now a plateau, with typical limestone scenery—gorges and combes, 'swallow-holes' and caves—and an absence of surface streams.

The plain of Somerset, which is covered chiefly with sandstone overspread with marl, is, for the most part, little above sea-level, difficult to drain, and subject to flood. Cattle-grazing and peat-cutting on the lower levels, mixed farming (oats, barley, and wheat) on the higher ground, and small textile industries (lace and sailcloth) in the towns summarize the occupations. The cultivation of sugar-beet increases.

Across the low-lying marshy plain is the county market town of Taunton. The Vale of Taunton recalls Herefordshire alike in scenery, dairy products, and fruit. In the south-west are the Quantock Hills and Exmoor, presenting a steep cliff face to the sea. Weston is a holiday resort. Bridgwater, the birthplace of Admiral Blake, is a thriving market town, at the head of the Parret estuary.

Devon is regarded as typical of England because its high moors, its rich valley pastures, and its proportion of ploughed land correspond to that for the whole country. Large numbers of sheep graze on its hills, its cattle are famous, and horses and pigs are widely reared. Butter, cream, cheese, and cider are typical products. Its varied scenery, open moorland and drowned valleys, and its mild climate attract many visitors. Ilfracombe and Lynton, on the north coast, Torquay, Dartmouth, and many other seaside towns on the Torbay coast are widely known. Exeter (66,000), a bridge town, is an important railway junction, with shipping facilities and many local industries.

The Devon and Cornwall peninsula, with its areas of igneous rocks, was once an important mining area, supplying tin and copper. Copper is now exhausted, but some tin is still mined. The granite hills provide building-stone,

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and there is a considerable trade in china-clay worked on the south of Dartmoor, in the north of Bodmin Moor, and in the hills north of St Austell. The fishing industry flourishes along its coasts, and for centuries has proved a hard but excellent school for seamanship. The variety of coastal conditions yields a variety of fish—pilchard, mackerel, plaice, and whiting. Barnstaple and St Ives, on the north coast, and Falmouth, Newlyn, Penzance, and Brixham, on the south coast, are the chief fishing centres. Flowers and early vegetables are of growing importance. The coastal towns attract tourists. A splendid natural harbour is shared by Plymouth (208,000) and Devonport, the former, like Southampton, being a port for liners, and the latter, like Portsmouth, a naval station. As this district is remote from any large industrial area, the volume of trade is small, and communications are restricted to the valleys and coastal areas, although the peninsula is well served by railways for passengers and mail traffic to and from the United States and West Africa. This remoteness has had a marked effect upon the character of the people, particularly beyond the Tamar boundary. The sturdy qualities of independence born of pride in a great past, and courage in facing change of conditions (for example, the decline of the wooden ship or of hand-made cloth), are found in fisherman, farmer, and miner alike. But the development of the tourist interests and improved means of transport are serving to bring the people into closer touch with the rest of Britain.

The Scilly Isles, thirty miles west by south of Land's End, are built of granite. There are five small inhabited islands, and many islets and rocks. The largest island is St Mary's. Mackerel fishing is important. The islands enjoy a very mild climate, and supply the mainland with early vegetables (especially potatoes), bulbs, and flowers.

The Channel Islands (Jersey, Guernsey, and smaller islands) are geologically like the neighbouring part of France. They attract many visitors, but there is also

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an important trade in early vegetables (tomatoes especially) and fruit. Channel Island cattle are famous breeds. There are daily steamer services from Jersey (St Helier) and from Guernsey (St Peter Port) to Weymouth and Southampton.

CHAPTER VIII

WALES

WALES consists of a plateau, with a core of old, hard rocks, intruded in places by thick masses of volcanic rocks. Some, chiefly in the north, are crystalline, indicating that they solidified slowly under a covering of other rock, but most are ancient grits, sandstones, and limestones. In Anglesey there are areas of gneiss and schist. The general character of Wales is a plateau, highest near the west coast, the remains of very old north-east and south-west foldings that have been reduced to a plain and once more elevated.

Only along the coasts, and in the south-western peninsula, is there much land below 1000 feet. The greatest heights are in the Snowdon Range, in the north-west, and culminate in Snowdon itself (3560 feet). The rocks which now form the peak of Snowdon are arranged in synclinal formation, so that this mountain summit was probably the floor of a valley between much loftier mountains since removed by erosion. A later sinking of the land has reduced the amount of lowland and flooded the estuaries of the west coast. As in the Scottish Highlands and the Lake District, ice-sheets in past ages, and running water, have carved out great valleys, which leave between them great blocks of mountains. In many areas there are evidences of ice action—rounded rocks, U-shaped valleys, striations, erratic blocks, and numerous areas of boulder clay. In addition, great faults developed, and these faults have been invaded by the sea, as in the case of the Menai Strait, or deepened by rivers, as in the Bala Valley.

Against this ancient mountain mass later rock formations

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have been folded, forming chiefly north-west trend lines along the English border and chiefly east-west trend lines in the south. The Carboniferous rocks of the South Wales coalfield are in the form of a syncline. The Millstone Grit and Carboniferous Limestone come to the surface forming an oval-shaped frame to the basin.

For the most part, rain runs quickly off the Welsh mountains, but there are large basin areas of moorland, where lie deep, mossy bogs. There are also areas of boggy moorland in places along the coastal lowland, the largest lying south of the Dovey (Dyfi) estuary.

The chief mountain blocks are:

- (a) The Snowdon group, north of the Barmouth-Dolgelly-Llangollen route (Snowdon 3560 feet, Carnedd Llewelyn 3484 feet, and Carnedd Dafydd 3430 feet).
- (b) The Berwyn Range, between the above route and the Aberdovey-Machynlleth-Severn route (Cader Idris 2920 feet, Aran Mawddwy 2970 feet).
- (c) The mass of Central Wales, including the Plynlimmon group (2469 feet), its south-west outliers, the Mynydd Bach (little mountain), and its eastern buttresses, Clun Forest and Radnor Forest (2166 feet). The Wye-Towy valleys separate this group from
- (d) The Brecon Beacons (2900 feet) and Black Mountains (2624 feet). This mass is composed of Old Red Sandstone, with the grain running east and west, whereas that of the other groups runs north-east and south-west.

The eastward-flowing rivers are perforce the longest and largest. Two, the Severn and the Wye, rise close to each other on Plynlimmon, within a few miles of the sea, but flow eastward. The Dee, in the north, and the Usk, in the south, are much shorter, the Dee following a rift valley, the Usk draining the area between the old plateau

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and the coalfield. To the north coast flow the Clwyd and the Conway. Of those flowing to the south coast the Taff, the Neath, and the Towy are the chief, while the shorter

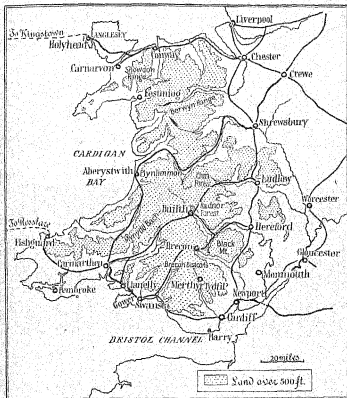


FIG. 49. WALES

Dovey, Ystwith, and Teify career headlong into Cardigan Bay. The Rheidol has cut back its source, captured the headstreams of plateau rivers, and so formed the famous gorge at Devil's Bridge.

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Radiating as they do in this way, none of the rivers offer easy through routes. The Dee, the Severn, and the Wye afford a roundabout route for railways, with difficult gradients. But the only routes with express services follow the north (L.M.S.) and the south (G.W.R.) coasts. Linking up these routes as they enter England is the railway from Newport through Abergavenny, Hereford, Ludlow, Shrewsbury, and Chester or Crewe. As a result of these diverging routes there is no natural central area on which to focus Welsh interests, such as the lowland valley of Scotland. The railways make Shrewsbury the most convenient meeting place. There is no undisputed Welsh capital.

Mountains tend to separate their inhabitants into clans, as in Scotland, Switzerland, North-west India, and the Balkans. In early times only danger from invasion united them, and that temporarily. At the same time the physical difficulties, such as barren slopes, heavy rainfall, and the restriction of agriculture to small patches of valley lands, develop sturdiness and stamina. But people remain isolated from influences which make for progress. In modern times, however, the development of Eisteddfodau has done much to spread widely a culture based on a national love of music and poetry. In early times special hardship often drove primitive mountain peoples to raid their more fortunate neighbours. England therefore guarded all these routes with castles. Chester watched the north coast and the Dee valley, Shrewsbury the Severn, Ludlow the Teme, Hereford the Wye, and Gloucester the south coast, while in Monmouth and Pembroke ("little England beyond Wales") ruined castles abound to show how difficult a country it was to hold. Conway and Carnarvon, in the north, tell the same story.

This independent spirit still survives in the use of the Welsh language. In many of the remoter valleys the older people speak no English. Welsh place-names are characteristic. 'Llan' (church), 'aber' (mouth or con-

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fluence of river), 'rhyd' (ford), 'cwm' (valley), 'caer' (castle or camp), and 'wy' (water) occur frequently.

Presenting a high, steep face to the west, Wales naturally gets a heavy rainfall at all seasons. Many parts on the west get nearly 100 inches, even Rhondda in the south gets over 80 inches. Toward the English border, on the



FIG. 50. LLANBERIS PASS, NEAR SNOWDON

By courtesy of the L.M.S. Railway

leeward mountain slopes, the rainfall is still heavy, being twice as much as in the eastern counties of England. The driest and sunniest part of Wales is South Pembrokeshire. Around the lower Dee and Clwyd the rainfall is only 30 inches. The soil covering of the mountains is thin, and flooding frequently occurs, but, fortunately, most of the valleys contain lakes, which check the flow and keep large supplies in reserve. Birmingham makes use of Lakes Elan and Claerwen, near Rhayader, in the

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upper Wye, as reservoirs, although they are seventy miles away. Liverpool uses Lake Vyrnwy, in one of the upper valleys of the Severn. Some of the lakes are used or artificially created for industrial purposes, such as generating electric power. Other well-known natural lakes are Bala, Ogwen, in Nant Ffrancon Pass, and Padarn, near Llanberis. These have a value of their own in attracting visitors by their natural beauty.

Only one-fifth of the country can be cultivated, and most of this is pasture. Oats are the most important cereal crop, and there is some wheat and barley. Sheep are reared in large numbers, chiefly for meat, and ponies also graze on the mountains. Woollen industries, such as flannel-making, have declined, but rural handicrafts are being fostered. Cattle are grazed on the plains of Anglesey, Pembroke, and some of the broader valleys, and pigs in Carnarvon, Denbigh, Pembroke, and Brecon. In North Wales, Carnarvon and Denbigh produce three-fourths of the slates of Britain. The Penrhyn quarries are famous; Bethesda and Festiniog are other centres of the slate industry.

On the north coast, Llandudno (14,000), on the Carboniferous Limestone peninsula of Great Orme, Conway, Colwyn Bay, Rhyl, and the Carnarvon coast towns of Penmaenmawr and Llanfairfechan are popular holiday towns. Barmouth and Aberystwyth (11,000), with its university college, are important west coast centres; Penarth and Tenby residential towns on the south coast. Salmon-fishing and mountaineering attract visitors to inland resorts such as Builth and Llandrindod Wells. Herring- and mackerel-fishing is an important occupation round the south-west coast, with Milford Haven and Fishguard as ports. Milford has a magnificent natural harbour, but Fishguard gives a quicker train service on the Irish route, Rosslare being fifty-five miles away. In the north, Holyhead is a little farther from Dublin (Kingstown).

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But the richest part industrially is the coalfield in the south. This covers about 1000 square miles, and has some 400 pits. The chief industrial towns are Merthyr Tydfil (71,000), in the north of the coalfield, Newport (89,000), near the eastern margin, Llanelly, Swansea, and Pontypridd, in the south of it. Port Talbot stands on

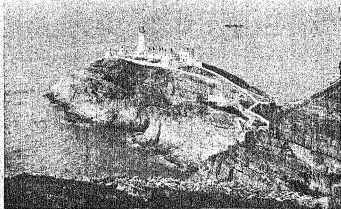


FIG. 51. SOUTH STACK LIGHTHOUSE, HOLYHEAD ISLAND

By courtesy of the L.M.S. Railway

the coalfield, but the other coal ports, Barry, Cardiff, and Newport, do not.

The ports are the largest towns on the area. In normal times no port in the world excels Cardiff (224,000) as a coal port. The high quality of its coal is universally recognized, and it finds a ready market in Spain, the Mediterranean, South America, and coaling stations like the Cape Verde and Canary Islands. Iron and steel are also exported. Ships calling for coal bring iron ore and pit-props, and there is also a considerable import of Irish potatoes, bacon, and dairy produce. The facilities for effecting

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repairs to ships are exceptionally complete. Newport has a similar trade. Port Talbot and Swansea also export coal, coke, and prepared fuel, tin-plates, copper-plates, and galvanized iron. Swansea (165,000) is the leading anthracite port of the world. The industries at Swansea are steel-plate rolling, tin-plating, and oil-refining, the crude oil being imported from Persia. Some iron is still mined on the north of the coalfield, but the chief supply comes from Spain. Copper is imported from Spain and Chile, and tin, which was formerly obtained from Cornwall, is now imported from the Malay States.

The coalfield has the advantage of having the most useful varieties of coal: anthracite (hard, slow-burning, but yielding great heat and little ash); steam coal (almost smokeless, and hard enough to stand transport and storing); and bituminous coal (softer and gaseous, useful for coke-making). The anthracite of the western part is found in smaller quantities than the steam coal of the east.

It has been mentioned that the coal lies preserved in a downfold (syncline) of the strata, but the surface slopes southward, and the rivers flow in parallel courses, cutting deep valleys and gorges through the southern limestone rim of the basin. The chief rivers are the Taff and the Teme, which trisect the area. Two great advantages follow from this formation—the coal can in many places be got at by drawing horizontal tunnels into the mountain sides, though most of the mines sink deep shafts; and the trucks carrying the heavy material, coal and steel, run down of their own weight, while on the return journey lighter pit-props and food-supplies are carried. But the isolation of these valleys has reacted upon the miner, who finds relief from the monotony of life in politics and music. The sea cuts into the edge of the coalfield in Swansea Bay and at Llanelly. An outlying belt of coal measures crosses the Pembroke peninsula.

The northern margin round Merthyr, Dowlais, Tredegar, and Ebbw Vale, is a Welsh Black Country, smelting both

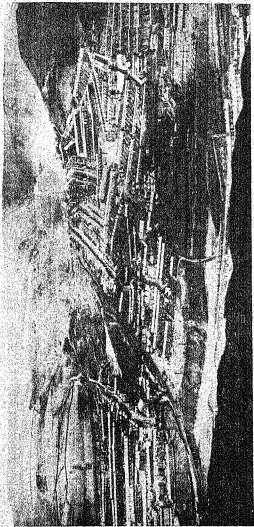


FIG. 52. A MINING TOWN IN THE RHONDDA VALLEY

Notice the bare hillsides and the rows of miners' houses; also the lines of trucks in the right foreground near the pit-head waiting to be filled.

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local and imported ore. The use of larger ships resulted in South Wales becoming dependent more upon imported ores than local ores. The ports, therefore, became the chief centres of the metallurgical industries. But the industry continues in the northern towns, although the cost of haulage up the valleys is a considerable handicap.

East of the Wye mouth there is another coalfield, the Forest of Dean, which, although in Gloucestershire, is geographically an outlier of the Welsh coalfield. There are several valuable mines there. In North Wales (Denbigh and Flint) occurs another Welsh coalfield, yielding some 3,000,000 tons yearly from pits at Ruabon and Wrexham. Compared, however, with the 50,000,000 tons production of South Wales it is unimportant. But mention must be made of the growing industries of silk and chemical works at Flint, and metallurgical works at Mostyn and elsewhere along Deeside.

CHAPTER IX

IRELAND

IRELAND is divided politically into Northern Ireland and the Irish Free State. Northern Ireland has its own Parliament, but also sends members to Westminster. Its six counties are Londonderry, Antrim, Down, Tyrone, Armagh, and Fermanagh. The capital is Belfast.

The rest of the island is the Irish Free State, which has been granted the rights of a Dominion (like Canada or Australia). The capital is Dublin.

The whole island is about the same size as Scotland, with a population nearly as large but more evenly distributed. Northern Ireland, too, is structurally akin to Scotland. The Mourne Mountains, in County Down, are a continuation of the Southern Uplands of Scotland. The central rift valley of Scotland is reproduced on a smaller scale by a valley running in the same direction from Larne to Armagh; while the Highlands are represented by the Sperrin group, the basalt of Skye by the plateau of Antrim; the line of Loch Fyne by Lough Foyle, and the rift of the Caledonian Canal by the West Donegal coast. The well-known formation of hexagonal pillars of basalt in Fingal's Cave (Staffa Island) occurs also in the Giant's Causeway.

Central Ireland is a plain of the Carboniferous rocks that occur in the Pennines and the Mendips, but in Ireland they lie flat, and are covered with glacial clay. Southern Ireland, however, has folded rocks with an east-west trend. These southern mountains are largely composed of the same kind of rock that occurs in the Brecon Beacons of South Wales and in North Devon—viz., Old Red Sandstone. They are all part of the same ancient foldings,

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and other fragments occur in Brittany, the Ardennes, and other parts of Central Europe. In Ireland the coal measures overlying the limestone have been almost entirely eroded away.

Most of the central plain is little over 200 feet above sea-level, with mountain masses round the coast rising to 2000 feet. Although low-lying, and surrounded by a mountainous rim, gaps between the mountains leave the



FIG. 53. GIANT'S CAUSEWAY

plain open to winds from the Atlantic. The climate is warm, equable, and moist, but the east, as in England and Scotland, is drier than the west (37 as against over 40 inches). The humidity is increased by the number of lakes lying in solution basins. The Shannon is a typical example. In five places its bed widens out into shallow lakes (Allen, Bodergh, Forbes, Ree, and Derg). All lakes tend to disappear either through the wearing down of the outlet through their rim by river action, or by becoming filled by river deposits and the growth of vegetation. In Ireland there are also large masses of clay left in rock basins since the Ice Age. Peat accumulates on the clay, which, under its pressure, slides to lower levels and be-
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comes bog. Bogs cover a large proportion of the country, the Bog of Allen being most famous.

Small coal deposits occur in Kilkenny and Tipperary

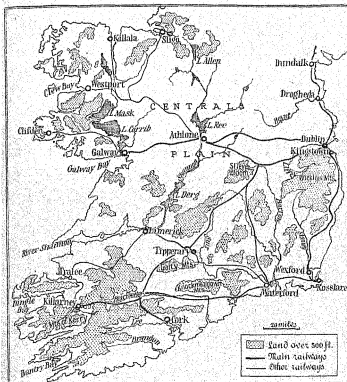


FIG. 54. SOUTHERN IRELAND

in the Free State, and in Antrim and Tyrone in Northern Ireland. But, except in Kilkenny, it is of poor quality, and only 1 per cent. in quantity of that produced in the rest of Britain. Coal to the value of £10,000,000 is imported chiefly from Ayrshire and South Wales. But peat

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is available in enormous quantities, and gives occupation to many people. There are great resources of water-power, which are being developed. The power-station recently erected near the mouth of the Shannon is the most notable example of this development.

The shortage of coal, the climate, and the flatness of the plain, make Ireland pre-eminently a pastoral country. Of crops only oats, barley, potatoes, and hay are profitable, and these occupy only one-eighth of the total area. Flax flourishes best in Northern Ireland, but small quantities are grown in the Free State. Animals can live out of doors all the year, so that cattle, pigs, and horses are reared in large numbers. Meath and Limerick have more cattle than any English county. Sheep are grazed only on the mountains of Donegal, other parts being too wet for them to thrive in any number.

South of a line joining Limerick to Dublin the country is more mountainous. The east-west trend of the Knockmealdown, Galty, and Kerry Mountains gives to the rivers which flow along the valleys between them parallel courses. The chief are the Bandon, Lee, Blackwater, and Suir. These all turn sharply southward to enter their estuaries, with Kinsale, Cork, Youghal, and Waterford at their respective harbours. It is probable that these sharp bends are due to the subsequent tributaries cutting their valleys backward along the softer rocks and beheading the original or consequent streams. On the south-west, these longitudinal valleys have become submerged into Dingle, Kenmare, and Bantry Bays. The floors of these bays shelf gently seaward, and are called rias, to distinguish them from fjords in Scotland or Norway, which look similar on a map, but are more deeply cut and have been moulded by ice action.

Communications. Ireland, like England, has neglected to develop canals as continental countries have done. Yet the river system is particularly favourable for the purpose.

In the Free State the Royal and the Grand Canals link

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Dublin to the Shannon at Lough Ree and beyond to Ballinasloe. In Northern Ireland the Ulster Canal joins Lough Erne *via* Clones and Monaghan, to the river Blackwater, and thus to Lough Neagh. The Lagan Canal links Lough Neagh to Lisburn and Belfast. The Newry Canal

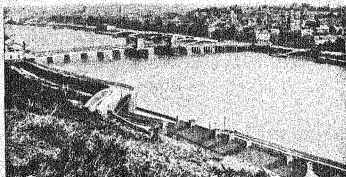


FIG. 55. WATERFORD

By courtesy of the G.W. Railway

joins the river Bann near Portadown to Carlingford Lough.

Although the Roman Catholic Irish have always differed from Great Britain in political matters, Ireland is compelled to look to Great Britain for its trade. Westward America is too far off; eastward Great Britain is nearer than the continent—near, yet not near enough for really close intercourse and mutual understanding. Industrial Great Britain needs Irish food-supplies, and pastoral Ireland needs British manufactures.

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The ports are the chief towns of Ireland. Dublin, as the best port for relations with England, is the focus of all communications in the Free State. The interior lowland offers easy ways for roads and railways, without much tunnelling or embankment. But traffic is comparatively light. The chief railways are the Great Southern,

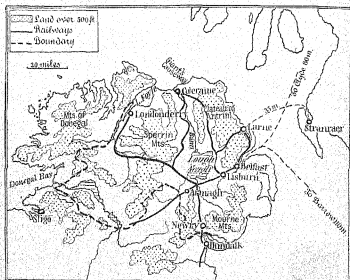


FIG. 56. NORTHERN IRELAND

Great Northern, and the Northern Counties Committee. The advantage of the Great Southern route from Cork to Dublin for passengers and mails from the Atlantic lines is less than it was, in view of the improved shipping arrangements. The route runs through a low pass to Mallow on the Blackwater, and by the Golden Vale across the upper valleys of the Nore and the Barrow to Dublin. Another main line skirts the coast to the plain of Wexford and Rosslare. Similarly, the Great Northern route follows

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the coast to Northern Ireland, Belfast, and Londonderry. Westward from Dublin runs a main line to Mullingar, the junction for routes to Galway and to Sligo. In Northern Ireland the railways connect Belfast, Larne, and Derry with each other and the inland counties. They are the Great Northern and the Northern Counties Committee, a branch of the L.M.S. Railway.

Goods which must be sold cheaply require a cheap route—*i.e.*, a route mainly by sea and as little as possible by rail. In the case of perishable goods, mails, and passengers, time is more important than additional expense, and these are conveyed by short sea routes. Hence the chief routes are as follows:

- (1) Holyhead to Dublin and Kingstown (57 miles) is the chief passenger route. The distance from Holyhead to Greenore is 70 miles.
- (2) Fishguard to Rosslare (55 miles) is the most direct route to London from Southern Ireland for mails and passengers.
- (3) Stranraer to Larne (35 miles) is the shortest passage.
- (4) From Glasgow to Belfast (116 miles) and Dublin (196 miles) come machinery and cotton goods. Linen and livestock, whisky and stout, are the chief commodities carried in the reverse direction.
- (5) Between Barrow or Heysham and Belfast (111 miles) goods traffic consists chiefly of iron and coal from the Cumberland field.
- (6) The Liverpool to Dublin route (121 miles) is used for textiles and food-supplies.
- (7) From Cork and Waterford foodstuffs are sent to Bristol (228 miles) and to London.

Industries. Dublin (317,000) is the seat of Government of the Irish Free State (Saorstát Éireann). The Castle, the two cathedrals, and the two universities remind us of its historical importance and relations with England. Like London, Dublin is the chief port, with agricultural country around it, and is built at the lowest point where

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the river—the Liffey—is bridged. And although local resources are small, numerous industries have developed, the chief of which are brewing, distilling, and the manufacture of poplin (a mixture of silk and wool). Supplies of wheat, sugar, petroleum, and maize, mainly of American origin, are imported from Liverpool.

Other towns in the Free State are mainly agricultural



FIG. 57. BELFAST LOUGH

Photo J. Valentine

centres. Wexford deals chiefly with Bristol in livestock, bacon, and butter. Waterford, on the river Suir, cures bacon and condenses milk. These products are exported chiefly to Fishguard, Milford, and Bristol.

Cork (78,000), on the river Lee, makes machinery and motor-cars, cures bacon, and exports dairy produce. Limerick also has manufactures, including lace, tobacco, linen, and leather.

Galway has a splendid harbour, but has no industrial

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area to serve it, and therefore remains a small fishing port, although quite a number of liners call in the summer months. The richest pastures of Ireland are in the Golden Vale of Tipperary.

Belfast (415,000) is equally the focus of Northern Ireland. Its people are intensely British in sentiment. This feeling is inherited from the Protestant settlers of Stuart times. Possessing the Parliament buildings, a university, a cathedral, a great shipbuilding industry, linen factories, breweries, and tobacco works, it makes a worthy capital. Like Dublin, it is linked to all parts with good communications.

Flax is grown north of Lough Neagh and near Newry, but 85 per cent. of the supply needed for manufacture is imported from Baltic countries. Linen is made at Londonderry, Coleraine, Lisburn, Lurgan, Portadown, and Newry. Ballycastle supplies some coal, but the bulk comes from Cumberland. The supply of iron comes mostly from Barrow, though some ore is imported from Spain. Iron, smelted from Austrian ore, is also imported from Scotland. Barley is grown locally for brewing, and Lancashire supplies chemicals required for this industry.

Londonderry (45,000) on Lough Foyle, with Moville its port of call for liners sailing between Glasgow and Canada, has lace, linen, and shirt-making industries. This industry extends into the Free State. At Dundalk linen-making, brewing, tanning, and some engineering are carried on.

CHAPTER X

SCOTLAND

THERE are three well-defined physical divisions of Scotland. (1) The Highlands, which occupy two-thirds of the whole country. This is a thinly populated upland region mostly covered by open moorland, with few towns, and those are situated mostly along the more fertile, low-lying eastern coast. Glen More, with the Caledonian Canal, separates the Northern Highlands from the Grampian Highlands. (2) The Central Lowlands of newer rocks lying between two parallel fault lines—Dunbar to Girvan and Stonehaven to the Clyde estuary. (3) The Southern Uplands, an old elevated area, but younger and lower than the Highlands, much carved by rivers, and covered largely by grassy moorland. Scotland being linked to England by natural land routes, the Scottish people, once as hostile as the Welsh and the Irish, have become thoroughly British, without losing their national character. Their sturdy love of freedom has taken them to every part of the Empire, yet Scotsmen everywhere are united by loyalty to their native land, and no race is more famous for its energy, courage, and capacity.

The Highlands. In spite of their crystalline rocks, thin, barren soil, and heavy rain, the Highlands were once more peopled than they are to-day. Different clans, jealous of one another, occupied the valleys. Blood feuds were not uncommon. The Central Lowlands, even before the discovery of coal, formed the prosperous part of Scotland, and was therefore subject to raids; while the people who occupied the valleys of the Southern Uplands raided both the Central Lowlands and the English border.

The Highlands are built mainly of Archæan gneisses and

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schists. Enormous denudation has exposed many bosses of granite. On the east there are areas of Old Red Sandstone. As a whole the rocks are extremely hard, and the present rounded masses are the result of countless centuries of the slow erosion of a much more elevated plateau. The level of the summits of the hills is strikingly uniform, rising to 3000 or 4000 feet. It is clear that they are mountains of circumdenudation, or residual mountains. In remotest times the Highlands were either reduced to a peneplain or cut by sea-erosion into a plain of marine denudation. Uplifted later and extensively faulted, the

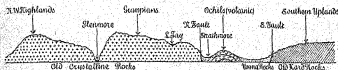


FIG. 58. SECTION ACROSS SCOTLAND FROM NORTH-WEST TO SOUTH-EAST

present relief is due mainly to erosion. The Ice Age interrupted the normal work of the rivers, and was mainly responsible for the rounded outlines and the thin covering of soil on the mountains, and for the lake barriers of morainic material. But these lake-basins are not entirely due to ice-action. The depth and certain other features of lake basins, as well as of the sea lochs of the west coast, suggest that they are due primarily to faulting. Then, too, the Highland valleys descend not regularly, but in a series of steps. The upper course of the rivers is not steep, but often meandering in the flat, badly drained basins. It is only between these successive basins that the river plunges rapidly, forming a fall or cutting a gorge. In the basins themselves there is more deposition than erosion. In some of these rock basins are fresh-water lochs of great depth, in others there are terraces of alluvial deposits, sometimes marshy, but often suitable for limited agriculture. The sea lochs are similar, being long, narrow,

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deep, and steep-sided. At the mouth of these fjords is a bar formed either of the terminal moraine left by the glacier of the Ice Age or the rock rim of the basin. So that if the sea-level were lowered these fjords would become inland valley lakes. The bar which encloses the deepest part of the loch is one feature that distinguishes

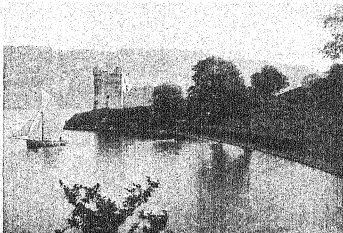


FIG. 59. LOCH NESS

Photo E.N.A.

the fjord from the ria of south-west Ireland, where depths increase steadily seaward.

The Highlands, therefore, possess in the inland lochs a reserve of water-power suitable for generating electricity. The waterfalls which occur between the different levels and the narrow, steep-sided valleys are both favourable features. Similarly, the winding sea-lochs afford sheltered harbours, with deep water at the natural rock wharf. But in both cases little use is made at present of these natural advantages, for the Highlands are unproductive of either minerals or other raw materials sufficient to become an industrial area.

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Glen More (the Great Glen) is much more a barrier between the Central and Northern Highlands than a route, and Inverness and Fort William at the two ends of the

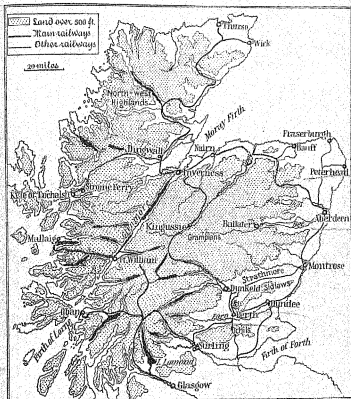


FIG. 60. NORTHERN SCOTLAND

Glen, are much more centres for routes across the Highlands to the south-east than entrances to the canal route.

The chief mountain peaks in the Grampians are Ben

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Nevis (4406 feet), Ben Macdhui (4296 feet), Cairn Toul (4241 feet), and Cairn Gorm (4085 feet). Farther east are Ben More, Ben Lawers, and Lochnagar, all lower in height. Most of this area is kept for grouse-shooting or deer-stalking, and there is good salmon-fishing. Between October and January the salmon go up the rivers, leaping the falls and rapids where necessary. The young fish come downstream in May. Salmon rivers, like the Tay, Dee, and Spey, are a great source of income.

While much of the Highlands is rented out to rich sportsmen, the region north of the Clyde, with Ben Lomond, Ben Vorlich, and Loch Katrine, the Trossachs and Loch Lomond, is a popular tourist district. Owing to the narrowness of Scotland in the Lowlands, the dense population is within easy reach of these lakes. Traffic comes through Glasgow, Stirling, and Perth, and from Edinburgh.

Off the west coast lie the Inner and Outer Hebrides. Lewis is the main island. Skye and Mull, of the inner islands, are old lava flows. Staffa Island has Fingal's Cave, like the Giant's Causeway of Ireland. Fishing (herring and cod) and sheep-rearing, with cottage industries (making of nets, sails, and ropes for their boats), are the occupations of these hardy people. Harris tweed is famous. The wool is sent to local factories for spinning, but returned to the homes for weaving. Stornoway, on Lewis, is the chief port, with sailings to (1) Strome Ferry, from which there is railway connexion to Dingwall, on Cromarty Firth, and (2) to Oban, with railway connexion to Glasgow. Oban is the chief tourist centre for the Western Highlands.

The Orkneys and Shetlands, separated from the coast by Pentland Firth, famous since Roman times for its strong current, have deeply cut coasts. Soils and climate limit the possibilities of agriculture, for which the Orkneys are more favoured than the Shetlands. Fishing, weaving, pony-rearing, and sheep-grazing are the occupations.

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Scapa Flow was the most important naval harbour in the Great War. The chief towns are Kirkwall, on Mainland, in the Orkneys, and Lerwick, on Mainland, in the Shetlands.

Along the eastern coast of the Highlands oats are widely cultivated, barley where suitable, and potatoes generally.

Inverness (22,000) is the chief town. Here the Glen More route, though little used, meets the coast route and the railway route from Perth (*via* valleys of Tay and Spey). It is a market town, with coastwise shipping trade.

Wick (the chief herring port), Fraserburgh, and Peterhead (granite quarries) are all fishing ports.

Aberdeen (167,000) is a large, important city and port, with a university. Routes from Inverness, from the Dee and Don valleys, and from the south converge on it. The country round is a cattle-breeding district, and cattle are exported. Grey granite is quarried extensively and exported. It is the chief of the east coast fishing ports, and does considerable export trade in herrings. Cargo boats bring miscellaneous goods, including paper-making materials, flour, oils and oil-seeds, phosphates, and coal. Aberdeen is very important as a centre for coastwise trade.

The Central Lowlands. This compact area, clearly bounded to the north and south by its fault lines, at a distance some fifty to sixty miles apart, and measuring only twenty-five miles from sea to sea at its narrowest part, has always been the centre of Scottish life—economic and cultural. Liable to attack from the less favoured Highlands, or from England by the few routes across the Southern Uplands, the Lowlanders learned to be united. To-day the Central Lowlands contain more than three-quarters of the population of Scotland.

Originally the lines of faults must have presented a series of scarps facing each other. Although erosion has reduced somewhat the sharpness of their slopes, the Highlands—and to a lesser extent the Southern Uplands—

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still present a bold edge to the plain. This rift valley is flooded by crumpled sedimentary rocks of the age of Old Red Sandstone and Carboniferous rocks. But volcanic rocks stand up boldly and form conspicuous features, both as interbedded strata and as sills, dykes, or necks, because they resist erosion better than the sedimentaries.

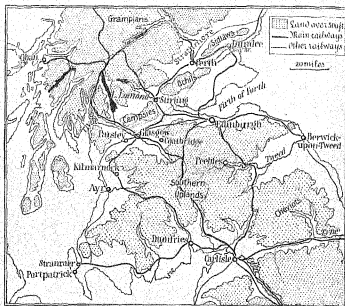


FIG. 61. CENTRAL LOWLANDS AND SOUTHERN UPLANDS

On the northern side, separated from the Highlands by Strathmore, occur the volcanic hills known successively as the Renfrew, Campsie, Ochil, and Sidlaw Hills. The rocks which lie across the valley, forming a watershed between the upper Clyde and the Firth of Forth, are also volcanic. Volcanic dykes and plugs occur among the disturbed sedimentary rocks, as Edinburgh Castle rock or Dumbarton or Stirling Law.

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The geological feature of greatest economic importance is the series of upfolds and downfolds in the sedimentary rocks. From the upfolds the coal measures have been denuded, but in the downfolds the coal, iron, and oil-shales have been preserved by newer rocks let down after faulting. The oil-shales occur only in certain parts; for example, on the east of the central basin round Falkirk. Three such basins can be traced. The Lothian and Fife, cut by the Firth of Forth; the large central basin (Lanark, Dumbarton, and Clackmannan area); and the Ayrshire basin in the west. The production of coal from these fields is in the proportion of 34 : 54 : 12. Ironstone and valuable fireclay occur with the coal, but as the ore is phosphoric, formerly it was not suitable for steel, but now, with more modern processes, it can be used. The bulk of the ore is, however, imported. The difficulties in the coal trade since the War have led to developments in using coal to generate electric power. The chief power-stations are at Glasgow, Kilmarnock, Falkirk, Edinburgh, Dumfermline, and Dundee. The falls of the Clyde are also used for this purpose.

The central coalfield is remarkable because it serves a variety of industries instead of concentrating chiefly on one or other of the great industries. The coal is used for engineering and shipbuilding, and in the manufacture of cotton, wool, sugar, tobacco, chemicals, and pottery. The Glasgow area, therefore, is like Newcastle, Manchester, Leeds, Bristol, and Stoke rolled into one. Dumbarton (22,000), where the river Leven from Loch Lomond joins the Clyde, Greenock (79,000), and Port Glasgow (20,000), along the banks of the estuary, are all shipbuilding and engineering towns. Paisley (86,000) is the cotton-spinning centre, but manufactures also machinery, cornflour, and starch.

Other industrial towns on the coalfield are Airdrie (coal), Coatbridge, Motherwell and Wishaw (smelting), and Dumbarton (paper, chemical bleaching, and dyeing).

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Hamilton (38,000) is the market town surrounded by rich coal mines. Originally the east of the Central Lowlands was the chief trading area, because it faced Europe. But the growth of transatlantic trade has given the Clyde area half the population of Scotland, and made Glasgow (1,088,000) the second city of Britain. Industries dependent on heavy imported goods concentrate near the river. But nearly half the workers are employed on metal industries. The remainder are occupied in tobacco, textile, and subsidiary industries connected with timber, grain, vegetable oils, chemicals, and soap. Thus, the Clyde area is the chief shipbuilding centre in Britain and the third in importance for exports.

The population of Glasgow increased 33 per cent. between 1911 and 1921, and is still increasing. Factors contributing to this may be summarized as follows: (1) facilities for development as a port—lowest bridge town of the Clyde—channel capable of deepening for large vessels and for dock construction—best gateway into Scotland from America and Ireland—focus of routes from England and the Lowlands; (2) presence of coal and iron; (3) west coast climate; (4) skill and energy of the people; and (5) adequate water-supply (domestic supply from Loch Katrine to Glasgow).

The Ayrshire coalfield, like that of Fifeshire, exports much of its coal, particularly to Ireland. Ardrossan, Troon, and Ayr are the ports, and are also fishing towns. Locally the coal is used for cotton, lace, and chemical industries. Kilmarnock (38,000) is an iron-smelting town, with engineering and railway works.

From the Fifeshire coalfield over half the coal is exported. Methil is the chief coal-exporting port in Scotland. The port of Burntisland serves the western mines of the area. The remainder is used locally for domestic use and for various industries. At Burntisland there is an aluminium industry based on imported bauxite. At Inverkeithing are foundries. At Kirkcaldy (44,000) oilcloth and

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linoleum are made of jute and cork fabrics coated with a preparation of linseed oil. In the last century this area cultivated much flax. As the linen trade grew, further supplies were imported from Russia. When this supply was interrupted by the Crimean war, jute was imported from India, chiefly to Dundee, which now is the centre of the manufacture. Dunfermline (35,000), however, still remains a linen centre. In Midlothian the coal lies east of the river Esk. There is no outstanding industrial town, but the coal is exported from Leith and used for the industries of Edinburgh.

The Central Lowlands have fertile soils, are less exposed than the adjoining regions, and valuable crops are grown. In general, arable farming predominates in the east, and pastoral farming, chiefly cattle, in the west. This is due partly to lower rainfall in the east and partly to soils. The most important agricultural areas are (1) the broad valley of Strathmore, sixteen miles wide, in which barley, oats, rye, potatoes, and fruit are cultivated; and (2) the Carse o' Gowrie, between Perth and Dundee, along the Tay estuary, facing southward, which is largely devoted to cereals and fruit.

Flax, which flourishes in cool districts with moderate rainfall, was formerly cultivated in the coastal areas of Forfarshire, and linen was made in the homes. Abundant water helped in the extraction of the fibres. Montrose, Arbroath, and Forfar for long continued the manufacture, with supplies of flax from Russia and Belgium. But the main occupation is agriculture, wherever such is possible. Although agriculture employs only about 5 per cent. of the working population its importance is great. Summer days are long, and this compensates to some extent for the lower angle of the sun's rays. Wheat, barley, oats, and even sugar-beet can be grown with success. The Scottish farmer is famed for his painstaking skill. The towns are chiefly market towns, commanding routes and having local industries in wool and leather goods.

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Perth (35,000) on the Tay and Stirling (23,000) on the Forth are historic bridge towns, commanding gaps between the volcanic hills. Perth bleaches linen and dyes jute and other fabrics. Stirling has a woollen trade in plaids and tartans. The ancient town of Cupar is the chief market of the interior plain of the Fife peninsula.

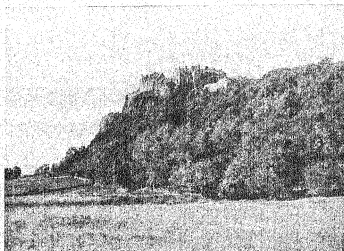


FIG. 62. STIRLING CASTLE

By courtesy of the L.M.S. Railway

Golf may almost be described as an industry of the peninsula, and St Andrews (with its university) is the headquarters of the ancient game. Dundee (176,000), near the Tay Bridge, is more than a market town. It is the third city of Scotland, with an industrial population working at textiles (jute, hemp, etc.), engineering, and jam-making, most of the materials for which are imported. Its advantages are that it is a port and that coal supplies are near at hand. It imports chiefly from India and exports chiefly to America. Successful jam-making depends

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upon nearness to fresh fruit and cheap sugar. Facing as it does the beet-growing countries of Europe, its sugar-supply is secure, while fruit is obtained from the Carse in summer and oranges from Spain for marmalade-making in winter.

The capital, Edinburgh (439,000), is the second largest city in Scotland. It grew up round its castle on the high volcanic rock commanding the route between the Highlands, Central Scotland, and Eastern England, either by

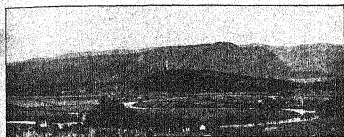


FIG. 63. THE LINKS OF FORTH: THE FAMOUS MEANDERS OF THE RIVER FORTH BETWEEN STIRLING AND THE FIRTH OF FORTH

Photo J. Valentine

the coast (the modern east coast route) or by the Teviot and Gala valleys (the Waverley route). Like most capitals, it is the headquarters of banking, legal, and business offices. But it has considerable manufactures, such as engineering, textiles, brewing, milling, and wood-work. Printing and publishing are also important, stimulated by the university and law-courts. It is also an important agricultural market. Water-supplies are obtained by boring, as at Burton, as well as from the distant head stream of the Tweed. Leith, its port, exports coal, and imports chiefly foodstuffs for distribution over the whole Lowlands.

The Southern Uplands. This area is a plateau, composed mostly of hard rocks of even texture like slate, often

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presenting their edge to the ground surface, but smoothed by ice erosion. Volcanic areas occur in the wild western part of the uplands, in the Nith valley, and in the Cheviot Hills to the east. The whole plateau has been deeply dissected by rivers, but the hills are mostly rounded and covered with grass and some heather. The coast regions and the valleys are the only parts where mixed farming

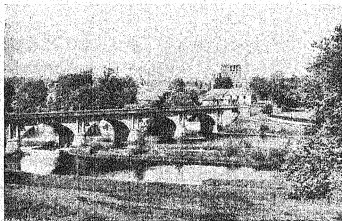


FIG. 64. KELSO

Photo Will F. Taylor

prosper, the rest being devoted to sheep pasture. The great abbeys at Dryburgh, Kelso, Melrose, and other places scattered about these dales indicate the prosperity won from the fertile soil. But the ruins also remind us of the warfare between the English and the Scots, which for centuries ebbed and flowed across the Border. This aspect of Scottish life has been immortalized by the tales and poems of Sir Walter Scott and Robert Burns, who lived respectively at Abbotsford, in Tweeddale, and at Dumfries, in Nithsdale.

The routes across these uplands, which form a barrier

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between England and the prosperous Central Lowlands, are of particular importance. They may be grouped as they concern Edinburgh and Glasgow respectively:

1. From Edinburgh railways follow (a) close to the coast, except where the Lammermuir Hills are crossed by a low pass near St Abb's Head, to Berwick; (b) the Gala and Esk rivers to the Tweed valley at Galashiels, thence up Teviotdale, through Hawick, across the ridge to the Liddel valley, and so to Carlisle (this is known as the Waverley route); (c) round the Pentland Hills to the upper Clyde, past Leadhills, to Annandale and Carlisle.
2. From Glasgow (a) up the Clyde to the Tweed; (b) through Kilmarnock, Cumnock, Nithsdale, and Dumfries to Carlisle; (c) round the coast, through Ayr and Girvan, westward to Stranraer, and eastward to Dumfries and Carlisle.

In Galloway, land is chiefly devoted to dairy-farming and sheep-rearing. Milk is dispatched to English towns, and even to London, and much cream, butter, and cheese are prepared for similar markets. Waste products are used for pig-rearing. Sheep are bred more for mutton than wool. Market towns like Wigtown, Dalbeattie, and Dumfries are found near the heads of the estuaries. Dumfries (23,000) has woollen and linen mills. Fishing is not important, except at Annan, on the Solway Firth.

The Tweed basin is a distinct unit. It faces eastward, and is enclosed on the west by bare, grassy, treeless hills. A million sheep find pasture on these encircling moorlands. The deep, narrow valleys of its tributaries—the Ettrick, Teviot, and Till, on the right bank, and the Whiteadder, Leader Water, and Gala on the left bank—shelter the market towns. The streams provide abundant water-power for woollen mills, and Midlothian coal is also available. Hawick (17,000) specializes in hosiery. Galashiels,

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Peebles, and Selkirk are important tweed-making centres. But local wool is insufficient. Five times as much as the home supply is imported, largely from New Zealand. The lower valley, called the Merse, which is roughly contained within the 400 feet contour, owing to its moderate rainfall of less than thirty inches and its glacial deposits, is one of

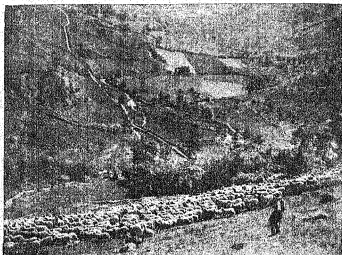


FIG. 65. A SHEEP DRIVE

This type of landscape is common among the Southern Uplands.

— Fox Photos

the favoured agricultural regions of Scotland. The chief cereal is oats; but barley, turnips, and beans are widely grown. Kelso and Coldstream are typical small towns of the region, important as markets for sheep and grain, but rural compared with the industrial towns in the higher valleys.

Berwick (12,000) is the natural outlet for the valley. As it also guards the route from England it continually changed hands in the Border warfare, but has remained an English town since the fifteenth century.

CHAPTER XI

FRANCE

THE parallel of latitude 45° N. cuts France at the estuary of the Garonne. France is thus placed half-way between the North Pole and the equator. As it lies on the west of the continent, with its high lands mainly in the east, it is open to sea influences. Of its three coasts, the northern one brings it into close relationship with England; its western provides an access to the Atlantic and the Americas; its southern to the Mediterranean and Africa. Each coast opens the way to influences which have profoundly affected French life and policy. Similarly, it may be said that France looks across three land frontiers to adjoining countries. For although on the east the land frontier is continuous, that in the north-east is a wide and open plain, leading to Belgium and Northern Europe, while farther south high mountains, broken only by narrow gaps, present a distinct barrier, as also do the Pyrenees on the south-west.

The outstanding feature of relief is the Central Plateau, round which stretches a lowland area. In Brittany and the Ardennes are found also highlands of old rock. Arranged between these highlands three fertile lowlands are found—the basin round Paris, the western basin of the Garonne and the old Duchy of Aquitaine, and the downfold of the Saône-Rhône valley. These three basins are separated from each other by ridges. The ridge between the Paris basin and Aquitaine is relatively low, and is cut by the wide gap of Poitou. The Plateau de Langres, between the Paris basin and the Saône-Rhône valley, is the higher divide, being twice the height of the Cotswolds. Associated with this classification three

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racial types can be roughly distinguished: the Nordic people of the north, fair-haired and blue-eyed; the round-headed Alpine type of Brittany and the central highland; and in the south the long-headed Mediterranean type.

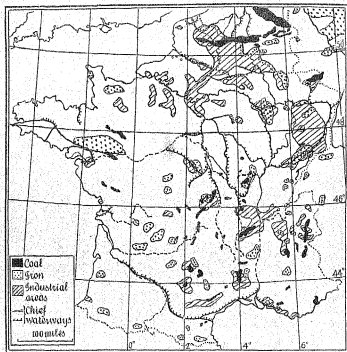


FIG. 66. FRANCE: INDUSTRIES

After Bowman

The Central Plateau, mostly between 1500 and 3000 feet high, is a rugged area of old crystalline and sedimentary rocks, much broken by faulting and volcanic action. The remnants of the cones of great volcanoes still stand conspicuous, and are named *puy*s; for example,

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Puy-de-Dôme and Puy-de-Sancy. It is thought that before the Alps were uplifted this area had been reduced by erosion to a peneplain, and was to a large extent covered by limestone. The thrust of the Alpine movement uplifted this great block so that it presents a steep face to the west and south, with a gradual slope to the



FIG. 67. A VIEW OF AUVERGNE FROM THE SUMMIT OF
PUY-DE-DÔME

Photo E.N.A.

north-west. The steep escarpment is known as the Cévennes. The power of erosion by the rivers was thus increased, so that most of the limestone has been removed. But on the south and south-west of the plateau there are wide areas of limestone, called *causses* (calx—lime), with characteristic scenery, deep river gorges, swallow-holes (*avens*), and caves.

In the depressions basins of coal have been preserved from erosion. The rivers have carried erosion deep into

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the underlying old, hard rock, and these glens, owing to their importance as routes, have attracted population. The soil eroded by wind and running water from the volcanic rocks of this plateau, adds to the fertility of the plains below.

The climate of France has characteristics similar to the climate of Great Britain when due allowance is made for the difference of latitude, the arrangement of relief, and the comparative size of the two countries. As in Britain, the winter isotherm of 40° F. runs north-south, but not so near the west coast, turning eastward before crossing the south coast, as it does in England. So that in winter the coldest part of France lies to the east, and the west is warm. Again, in summer the isotherm of 64° F. may be compared with that of 60° F. in Britain. In general its course is from west-east, indicating that the south is warmer than the north. The influence of the sea accounts for the curve near the coast. The effect of the larger land mass is seen in the range of temperature at Paris of 29.3° , as compared with the range at London of 26° .

The prevailing winds of the north and west coasts are south-westerly, bringing rain at all seasons, but most in the winter half-year. The rain-bearing winds penetrate far inland, with a maximum fall where the land is highest. The Mediterranean coast is the warmest and driest part. Rain falls chiefly in autumn, but in heavy storms rather than over protracted wet periods, and winds at this time of the year tend to be cold and northerly, owing to the low pressure over the Mediterranean. The summers on the Mediterranean coast are hot and sunny. The cloudlessness of the summer is one of the important climatic features, and there are marked periods of drought. Thus, from about lat. 45° northward France gets rain at all seasons. Rain-fall is more evenly distributed than in Great Britain, owing to the higher ground being in the east. It is heaviest at the western end of the Pyrenees (70 inches), lightest along the west coast of the Gulf of Lions (under 20 inches) and

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in the Paris basin (22 inches). In summer rainfall closely follows topographical features, with thunderstorms, particularly in the mountains.

The effect of the rainfall upon the courses of the rivers is important. The Seine and its tributaries, like the Thames and its tributaries, flow over a series of rock and soil formations, including porous rocks and clays. It is fed largely by rain supplied by the Vosges and Jura mountains. But the Yonne rises on the edge of a plateau of impervious rock, and is a source of occasional flooding. The limit between high and low Seine is small. It is not liable to flood, except in times of frost, when rocks become impenetrable. The Loire gathers water round the Central Plateau, off which it runs rapidly. Its course is therefore erratic, and navigation is difficult to regulate, as the river may be very shallow or a raging torrent. The Garonne similarly draws its winter water from the Central Plateau, and in summer is supplied by streams from the melting snows of the Pyrenees. This additional supply renders it liable to floods, but the porous Jurassic, Cretaceous, and Tertiary soils over which it flows mitigate this evil. The Rhône is chiefly supplied from the melting snows of the Alps, and gets practically none from the west, except in spring and autumn, when floods occur in southern France very suddenly. Its tributary the Saône rises in Lorraine and flows sluggishly, and is therefore frozen for a week or two during the winter.)

France is essentially an agricultural country. Although it is over twice the size of Great Britain the population (about 41,000,000) is not so large. It is more evenly distributed and there are few large towns. In Britain and Ireland there are twenty-three towns with a population over 200,000; in France only five. Population is more crowded in the industrial areas and also in the vine-growing valleys. Variety of soils and moderate climatic conditions produce a wide variety of crops. Wheat is grown everywhere, except in the wetter west and the

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highlands, where rye and barley are grown instead. There is eight to nine times the acreage under wheat in France compared with Britain, but the yield per acre is lower.

The Paris Basin. Structurally the Paris basin resembles the London basin, but is on a larger scale. Paris stands a hundred miles from the sea in the heart of a plain composed of recent rocks. Round it escarpments facing outward are arranged in a series of concentric arcs. First the chalk escarpment (*cf.* the Chilterns and Downs), the dip slope of which to the east is known as 'Dry Champagne' because its soil is waterless (see Fig. 68). At the foot of the escarpment is a clay-vale country known as 'Wet Champagne'; then another dip slope leading up to the limestone escarpment (*cf.* Cotswolds), the line of which is marked by the river Meuse flowing at the foot; then a further clay vale (*cf.* the Severn valley); beyond which the granite block of the Vosges

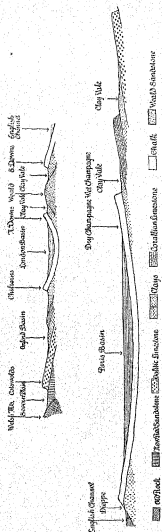


FIG. 68. SECTION ACROSS THE ENGLISH LOWLANDS AND THE SEINE BASIN ON SAME HORIZONTAL SCALE

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reminds us of Wales. Along the coast between Le Havre and the river Somme chalk cliffs appear, as on the English coast. The comparison may be carried farther by likening the Central Plateau to the Pennines, both formed of old rocks and containing basins of coal, and both constituting the chief watershed of the country. But care must be taken to remember that the rock structure differs in character and in formation, and that the Pennines lie



FIG. 69. A VIEW OF THE FRENCH NORTH-EAST COAST,
NEAR DIEPPE

By courtesy of W. B. Bradford, Esq.

much nearer the west coast than does the Central Plateau. In the plateau of Brittany we have a country similar to Cornwall and Devonshire. The central part of the Paris basin is known as the Île de France.

The Seine and its tributaries are navigable for long distances. Ocean vessels can reach Rouen, and even Paris. The orderly arrangement of its tributaries is a noticeable feature. Canals connect the rivers Somme-Oise-Meuse; the river Marne to the Meuse, the Rhine to the Saône; the lower Yonne river to the Saône, and the Seine to the Loire.

Although some of the soils are dry and infertile, the

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whole area is important for agriculture. The country north of Paris—Normandy and Picardy—produces similar crops to south-east England. Sugar-beet is important, and oats, hops, and flax are widely grown. Dairy cattle are kept on the rich pastures, and sheep in the drier areas. Great attention is paid also to horse-breeding. As the district

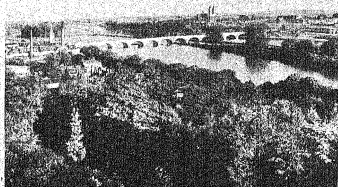


FIG. 70. TOURS: GENERAL VIEW SHOWING THE VALLEY OF THE LOIRE

Photo E.N.A.

is north of the vine-growing areas, beer and cider take precedence of wine, owing to abundance of grain and orchards. Market-gardening is carried on in the moist valleys by intensive methods. Much of the uncultivated country is forested. The towns are market towns, the most notable being Amiens, which also has a cotton industry.

In the limestone and clay country to the east, sheep predominate on the higher slopes, but there is much

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woodland. The sunny slopes of the escarpments are devoted to vine-growing for champagne. Occupations centre naturally round wool, wine, and quarrying. Market towns are built along the junction of clay and rock, and where they command gaps, are fortified; for example, Épernay, Toul, and Reims.

The alluvial soil in the valleys of the Loire basin is very fertile. The numerous castles, *châteaux*, and cathedrals, and the picturesque villages and market towns, proclaim its prosperity. It is a smiling country of woods and grassy meadows, nursery and market gardens, wheat- and oat-fields, and vineyards. Orléans and Tours are famous bridge towns, with important markets. Nantes (184,000), the seaport, is the largest town, but the Loire is so uncertain that it is navigable for only about thirty miles, and a canal is necessary to avoid the sandbanks at the mouth of the river. At Nantes are sugar-refineries and foodstuff factories.

Paris is the focus of routes which are important not only for France, but for Europe.

- (a) The Marne valley route to the Rhine—important for both defence and trade—*via* Épernay, Bar-le-Duc, to Toul, Nancy, and Strasbourg.
- (b) The Seine and Yonne route across the Côte d'Or, and by tunnel to Dijon, where the route divides, to proceed northward to Belfort and the Rhine, and southward to Lyons and the Rhône.
- (c) The route south-westward to Aquitaine *via* Orléans, Tours, Poitiers, and Bordeaux to Spain.

The following routes from Paris should also be carefully noted on the map: (1) to Amiens and the Channel ports and to Lille and Brussels; (2) the Oise-Sambre valley route; (3) to Troyes, Langres, Belfort, and Basle; (4) to Sens, Nevers, Vichy, and the Allier valley to Alais and Nîmes; (5) to Orléans, Tours, and Nantes; and (6) to Limoges and Toulouse, along the edge of the Central Plateau.

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Paris is thus a geometric centre of a fertile basin. Its population is nearly 3,000,000. Besides being the capital and centre of every aspect of French activity, and the resort of thousands of visitors from all parts of the world, it has extensive industries. These range over a wide

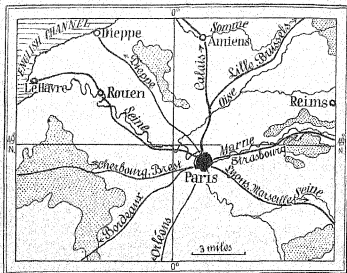


FIG. 71. PARIS: THE FOCUS OF ROUTES

variety, necessities and luxuries, none outstanding, but in the aggregate of great value. It is accessible from the sea by small vessels, but its ports are Rouen (123,000), the Manchester of France and lowest bridge town of the Seine; Le Havre (158,000), at the mouth of the Seine, the second port of France, but with only half the trade of Marseilles. Both import coffee and cotton (from South and North America), coal and timber, and export cotton and woollen goods. Dieppe, Boulogne, and Calais are the Channel ferry ports.

FRANCE

The chief industrial area of France is in the north-east in the departments of the Nord and Pas-de-Calais (Fig. 66). But manufactures in France employ only one-quarter of the number engaged in agriculture.

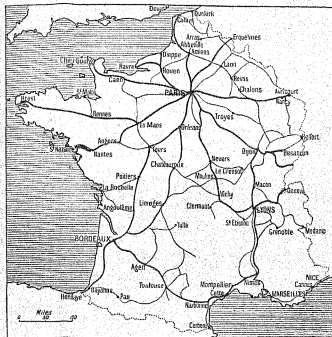


FIG. 72. FRANCE: RAILWAYS

On this part of the Franco-Belgian coalfield there are two classes of manufacture:

- (a) *Coal and Iron.* Mines at Valenciennes, Douai, Lens, Béthune, and Maubeuge; but iron from Lorraine is chiefly used for the manufacture of steel. Lille is an engineering centre, with cotton and woollen and sugar factories as well. There are

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coal and iron industries also in the Central Plateau.

- (b) *Textiles*. Cloth is woven at Roubaix, Amiens, and St Quentin. Cotton and linen goods are made at Cambrai, Armentières, Tourcoing (wool as well), and Roubaix. Cotton manufacture is carried on also in two other centres—the lower Seine and the Vosges mountains.

Dunkirk is the chief port for wool, which is imported chiefly from Argentina. Its trade ranks third among French ports, and includes also cotton and flax.

Brittany. Two ridges of the ancient Armorican mountain system cross the region from east to west, where they converge. Between them is a depression, drained by rivers to the west and south-east. The granite and old sedimentary rocks are like those of Devon and Cornwall, as also are the broken ria coasts. The coasts are the prosperous parts, depending chiefly on the tourist trade, combined with fishing and market-gardening. The north coast has more alluvial soil than the south, and the land is manured with seaweed instead of lime. St Malo is the fishing centre. Boats go even as far as the Newfoundland Banks. Cherbourg is a port of call for American and other liners (*cf.* Southampton). Brest and Lorient are chiefly naval stations (*cf.* Plymouth), but tides and currents are treacherous off the coast. The interior is isolated and poorer. Barley and rye are grown on the better soils, also fruit and some sugar-beet. Large areas are devoted to dairy farming. Rennes (83,000) is the largest town built where the Paris-Brest route crosses the St Malo-Nantes route. The eastern part of the region is open to French influences, but the Bretons of the west are really Celts (*cf.* Cornwall and Dorset).

Aquitaine. This is a low, rolling plain, in which the rivers Charente, Garonne, and Adour have cut entrenched valleys. The latter two are subject to flooding, so that

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communication north and south is not easy. It is entirely an agricultural area, with a warm, equable climate, and rain at all seasons. Many oak-woods are found scattered over the plain. They are useful not only for the timber, but also the acorns upon which pigs are fed. Maize is a more important crop than wheat in this area. Aquitaine is also a great vine-growing region, producing wines known as Sauterne, Médoc, and others. Cognac, in the Charente

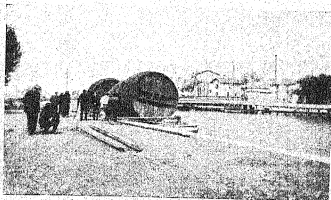


FIG. 73. HUGE WINE-BARRELS ON A BARGE BY THE QUAYSIDE IN SOUTHERN FRANCE

valley, is the brandy-distilling centre. Angoulême is a typical market town. Fishing is carried on at La Rochelle.

Toulouse (181,000) is the leading town of the Upper Garonne. Toulouse and Carcassonne, connected by the Canal du Midi, guard the two ends of the Carcassonne gap between the Central Plateau and the Pyrenees. Both are interesting medieval towns, and markets for wine and tobacco. Bordeaux (256,000) is the outlet of the basin. Situated on the left bank of the river and at the head of the Gironde estuary, it is the fourth city of France and the chief wine port. Distance from coalfields has proved a hindrance to its development, but it has a considerable

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trade with Britain, West Africa, and South America. Importing coal from Britain, iron from Spain, tobacco, cacao, and coffee from South America, and oil-seeds from West Africa, its industries include the manufacture of chocolate, sugar, corks, bottles, and dried fruit. Its exports are chiefly wine (claret) and brandy.

South of the Gironde estuary stretches the district of the Landes. Protected from the sea only by a fringe of sand-dunes, the whole area is really a sandy waste, but the surface is hard and impervious enough to prevent water sinking in, so that its marshes have an evil reputation. By drainage and the planting of pines, a large part has been reclaimed for sheep and even cattle pasture, so that it has become habitable in parts. The foothills of the Pyrenees, drained by tributaries of the Garonne, have many valleys with rich alluvial soil, yielding maize and general crops, and the towns of Pau, Tarbes, and Lourdes (the pilgrim town) are prosperous. Tourists are visiting this region in increasing numbers, and Biarritz is a rich resort.

The Central Plateau. This triangular plateau, tilted toward the north-west, presents a steep escarpment on the south-east, known as the Cévennes. The region has a hot summer, sunny autumn, and severe winter. This mass of ancient rock was subjected to great strains when the upfolding of the Alps took place, and great faults are numerous. The valleys of the Allier and Loire are rift valleys. Along some of these faults mineral springs occur, giving rise to spas, of which Vichy is the best known. Like all volcanic rock when broken down by weathering, the soil carried by wind and rivers from these mountains into the warm, sheltered valleys proves extremely rich. Wheat, maize, sugar-beet, and fruit flourish, with jam-making and dried fruits as the industries. Clermont-Ferrand (112,000), at a junction of routes, is the market centre for Auvergne, and makes motor-cars. Its rubber industry is important. On the exposed western edge of

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the plateau, where the granite weathers rapidly, porcelain is made—e.g., at Nevers and Limoges, which is also a cattle market and leather centre.

The headwaters of the Seine, Loire, and Garonne all begin here, but being subject to floods are useless for transport. Most of the land is moorland and heath, so that cultivation is possible only in the valleys. Cattle,

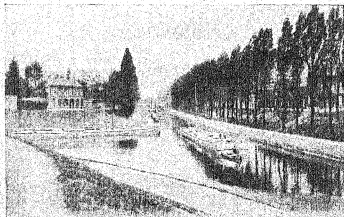


FIG. 74. A FRENCH CANAL

Photo E.N.A.

chiefly in the north and west (especially in Auvergne), and sheep are reared in large numbers. The coal-mines of St Étienne, Le Creusot, and Alais supply ironworks which make munitions. St Étienne (194,000), the most important of these towns, also has silk factories, supplied from the mulberry-growing district in the Rhône valley.

The Mediterranean Coast. This is the warmest and driest part of France, although subject to a cold north wind called the mistral, except along the French Riviera, where Nice, Cannes, and other places flourish as tourist resorts. The delta of the Rhône (called the Camargue)

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bisects the region, and forms a wild, swampy area, suitable only for rather poor pasture for horses and cattle. The ports lie east and west of it. But those in the west, like Cette, rapidly silt up from the river deposits, owing to the absence of tides. The silt is carried westward by currents, so Marseilles and Toulon, thirty and sixty miles east of

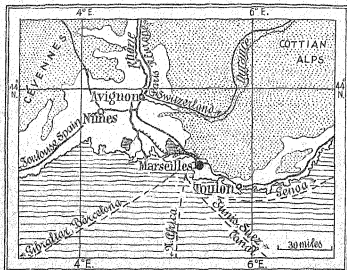


FIG. 75. THE POSITION OF MARSEILLES

the delta, are respectively the great commercial and naval ports.

Marseilles (652,000), the oldest and greatest French port, receives silk from the Far East, oil-seeds from Africa and India, cotton from Egypt and India; timber, olives, and olive oil from the Mediterranean lands, coal from Britain, and cereals, wine, wool, iron ore, and phosphates from French North African colonies. Its industries use these products for making soap and candles, cereal food-stuffs, and perfumes. But it also exports textile manu-

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factures, including silk, sugar, and leather goods. Its passenger trade is important, because the overland route London-Calais-Marseilles saves six days on a voyage to the East. Railway connexions are good also *via* the Burgundian Gate (Belfort) to the Rhine; *via* Geneva to Switzerland; and along the coast to Italy and Spain. The port is connected to the Rhône by canal, but the river is too swift-flowing for good navigation.

The Saône-Rhône Valley. This depression between the ancient block of the Central Plateau and the folded Alps is a great route. The Rhône receives large tributaries, the Saône, Isère, Durance, Doubs, from the Alps and Jura, and only short, swift streams from the west. Lyons (571,000), at the confluence of Saône-Rhône, is a route centre for the Mont Cenis route to Turin, the route to Geneva, and the route westward round the north of the plateau to Paris or Bordeaux. Railways follow both banks of the river. Lyons is a bridge town, supplied with power from the St Étienne coalfield and from the Alpine valleys, and is one of the chief silk-making cities in the world. In the provinces of Savoy and Dauphiné the villages are centres of peasant industries—especially the making of kid gloves in the district round Grenoble. At Besançon, in the Jura mountains, watches are assembled, largely from parts made in the Swiss area.

Dijon (84,000) is another important junction. In addition to the main routes to Paris and to the Rhine, a route to Switzerland lies east through Pontarlier (a gap town in the Jura), and another south-west to the Loire valley. Dijon is the chief centre for Burgundy wine, and receives other agricultural produce which is sent there to be manufactured into foodstuffs.

Lorraine is a highland region, heavily forested, and its agricultural land is relatively poor, but it is rich in minerals. The Moselle and Meuse cut deep valleys. On their banks are great fortresses—Metz on the Moselle, and Épinal, Toul, and Verdun, on the Meuse. The river

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valleys are routes. Nancy (114,000), a market town, stands where the route from Strasbourg round the north of the Vosges joins the Moselle. The route is followed by both railway and canal. Nancy and Longwy manufacture iron goods from the local supplies of iron.

Briey is famous for its iron; the Saar basin provides coal, but not of the type best suited for producing coke, which is so important in smelting. Coal for this purpose is obtained from the Ruhr basin of Germany. These works have doubled the output of iron goods for France. In the sandstone rocks rich deposits of salt are worked, and soda is manufactured.

Alsace lies between the Vosges and the Rhine. The Vosges mountains are a great block of ancient rocks flanking the rift valley of the Rhine on the west, as the Black Forest does on the east. This is a rich agricultural country, in which vines, tobacco, and fruits flourish. Valuable deposits of potash are mined at Cernay. Mulhouse (100,000) is the centre of a prosperous cotton industry, which developed from the earlier wool-trade. Strasbourg (174,000), the largest town in this area, is now linked by canal to the Rhine, which will prove a great advantage. For Strasbourg stands on the river Ill, which flows northward along the floor of the valley parallel to the Rhine. The Saverne gap, leading from Strasbourg to Nancy, is an important link in the Great Orient line from Paris to Constantinople.

CHAPTER XII

THE LOW COUNTRIES

PHYSICALLY both countries are in the main one lowland, linking the North German plain with the plains of France. Belgium is largely the lower basin of the Scheldt and the middle valley of the Meuse, which both rise in France, and Holland the delta of the Meuse and the Rhine, the course of the latter being chiefly through Germany. But there are marked differences in the natural character of the two peoples, as reflected in religion, art, architecture, history, and occupations. The Dutch fought triumphantly for their Protestant faith, and in this respect are associated with the peoples of Northern Germany and Scandinavia. The Belgians are largely a Catholic nation, and although the people in the northern half of Belgium (Flemings) are akin to the Dutch in racial characteristics and language, this religious factor has served to unite them to the Walloons of South Belgium, who in race and language are akin to the French. Holland faces Germany across its eastern boundary. So that for this and other reasons the experiment of uniting the two countries in 1815 proved a failure.

The commercial interests of the two countries are also different. Holland is mainly agricultural, while Belgium is for the most part industrial. Holland has a little coal in the south-east corner, but the Belgian coalfield gives a yearly output three times that of Holland. Belgium also has other minerals, iron ore in the Ardennes, lead, copper, very rich zinc deposits (near Verviers), limestone, and slate. Holland has none of these—only clay for pottery.

Belgium, therefore, has a metallurgical industry round Liège as important as that of Essen in Germany. In the

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Ardennes Belgium has a splendid sheep-rearing district. Wool, water, and coal gave rise to an important textile industry, much greater than that of Holland, where cattle are far more important than sheep. One half of the area of Holland is either heath, moorland, or meadow below

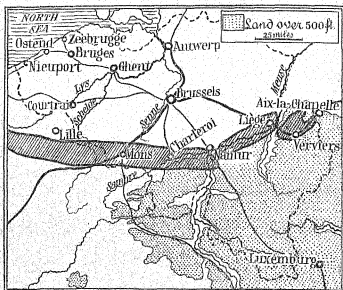


FIG. 76. BELGIUM: RELIEF AND COALFIELDS

sea-level, more suitable for rich pasture and horticulture than for other crops, except sugar-beet. Belgium grows wheat, barley, oats, rye, and flax in much larger quantities. The higher land of Belgium has facilitated the construction of a very complete railway system, whereas Holland has to rely mainly on waterways. But, on the other hand, Holland has excellent ports—the Hook of Holland, Flushing, Amsterdam, and Rotterdam—and these have both canal and railway connexions to the

THE LOW COUNTRIES

valleys of the Rhine and Ems in Germany. In Belgium only Antwerp can take large liners, and the mouth of the Scheldt estuary on which it stands is Dutch. Traffic on the Meuse must also pass through Holland. The Dutch shipping trade is a dozen times as great as that of Belgium. These shipping facilities have an important bearing also on fishing and overseas trade. In both respects Holland scores. Another comparison exists in the Dutch possessions in the Far East, which remain to remind us of the larger empire of earlier times, and which are much more economically developed than the Belgian Congo, a comparatively recent colonial acquisition.

As a result of all these factors combined both countries have a large population (nearly 8,000,000) for their area, which is about 12,000 square miles in each case. Parts of Belgium have over 1000 people per square mile. In Holland sites of towns and villages are much more restricted, land being either not dry enough or too valuable to build on.

One of the greatest contributions both Holland and Belgium have made to the world consists of their art and handicrafts, and their culture generally. The work of Rubens, Rembrandt, and Van Dyck, and many other great artists, the cathedrals, the halls of Brussels, Louvain, and Ypres, the belfries of Bruges, the beautiful furniture and fabrics, all are a form of wealth the value of which cannot be estimated. Britain owes a debt to the Dutch explorers and international lawyers as well as to the Flemish weavers. It is no wonder that tourists flock to Holland and Belgium from all parts of the world to enjoy the beauty of their pictures and buildings.

BELGIUM

There are two main regions:

- (1) The South-east Uplands, which rise to heights of 2000 feet, and are made of rocks similar to those of Devon

*I love this
Hobart 407*

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and Wales. Along the Sambre-Meuse valley lie Carboniferous rocks, with coal. This is the other part of the coal-field already mentioned in connexion with northern France. The mines are in three groups, sixty round Mons and Charleroi, forty round Liège, and a dozen or so round Namur. Charleroi produces one-third of the total output. These Belgian mines are becoming increasingly difficult to work, although there is a good reserve.

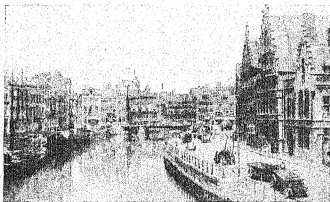


FIG. 77. A QUAY AT GHENT

By courtesy of the Belgian Legation

The manufacture of rails, machines, locomotives, and munitions is carried on at these coal-mining towns. Sand from the Campine district along the Dutch border, and limestone facilitate smelting and the manufacture of glass and chemicals.

(2) The Central Plains are covered with rich, loamy soil. The crops in order of yield are oats, rye, wheat, potatoes, and sugar-beet. Flax is an important crop in the valleys of the Scheldt and Lys. The water of these rivers is free from lime, and is therefore good for bleaching. The climate suits the plant, but the home supply of flax is insufficient. Labour is obtainable at low wages in

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Belgium, so that the fibre is extracted cheaply. Linen is made at Ghent, Courtrai, and Tournai. Ghent has a canal to the sea, providing cheap transport, and Belgium is within easy reach of good markets. Although the textile industries of the country are based primarily upon the local supply of flax and wool, cotton, silk, jute, hemp, and artificial silk goods are also made. The new Campine coalfield in the east is increasing its output every year.

Brussels (826,000), the capital, has varied industries, and stands in the centre of the plain. It has water communication with the sea and the coalfield, and railways to Antwerp, Ostend, and France, and to Cologne, in the Rhine valley, *via* Aix-la-Chapelle (Aachen).

Antwerp (300,000), the port, controls the trade, which is mainly with Britain, the Belgian and Dutch colonies, and Germany. Cotton and wool imports, destined largely for Germany, grain, petroleum, sugar, and machinery are the chief commodities handled at the port. Its own industries include sugar and soap factories, flour-mills, and tanneries.

Along the coastal plain are Bruges and Zeebrugge, connected with the sea by the Zeebrugge Canal. Both places are world-famous for their past and recent history.

HOLLAND

A quarter of Holland is below sea-level; only on a few parts does the country attain an altitude of more than 300 feet. Eastern Holland is the higher part; there the soil is either sandy heath or marshy meerland. Western Holland is the rich part, although mostly below sea-level. The polders are protected by a great system of dykes. In the thirteenth century during a terrific storm the sea broke through the dunes marked by the present Frisian Islands and formed the Zuider Zee. A great dyke, 18½ miles long and 120 feet wide at the top, has converted the Zuider Zee into the IJssel Lake, and will carry both a road

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and a railway. The courage of the Dutch in their ceaseless struggle against the sea, and for freedom from their enemies on the land, has never wavered. These adversities have produced a united, persevering, and hardy race,



FIG. 78. HOLLAND: THE STRUGGLE FOR LAND

From *"The New World: Problems in Political Geography,"* by Isaiah Bowman (The World Book Company, Yankers-on-Hudson, and George G. Harrap & Co., Ltd., London)

whose colonies overseas are the reward of their unconquerable courage at home.

The land is drained by the construction of canals, into which the water is pumped. In the absence of water-power and coal, wind is harnessed for this work. The dykes act as highways—both for roads and canals—and in winter, when skating is a universal habit, the canals also serve as roads. Black and white cattle, fields divided

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like a chessboard, often brilliant with bulbs in blossom, white houses built long and low, with warm-looking red roofs, the absence of trees, except lines of stately poplars—these are the features that give character to Dutch landscapes. Houses line the canals. Towns cluster along the junction of the polders and the dunes where springs occur, becoming smaller toward the north. But no less than a



FIG. 79. FOLDERS

Aerofilms, Ltd.

quarter of the population lives in the four chief towns. Amsterdam (743,000) was built on piles. Since the silting up of the Zuider Zee, ship canals to IJmuiden and Helder have enabled it to retain its premier position as the commercial capital. Most of the Dutch colonial trade enters Amsterdam—tobacco and spices from the East, cane sugar from Guiana, and coffee, fruit, and cocoa. When South Africa was Dutch, diamonds were brought here for cutting and polishing, and Holland is still the best field for this work. Since the thirteenth century, when it was one of the Hanse towns, but especially since the seventeenth

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century, when the Dutch empire in the East Indies was established, Amsterdam has been one of the world's leading ports.

Rotterdam (578,000), a few miles up the Rhine, has easier communication with both the sea and the interior. Like Antwerp, it faces the Thames estuary, and both compete with London for the world's trade. Like Ant-

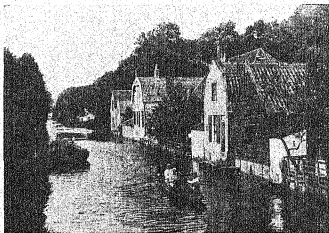


FIG. 80. A CANAL NEAR HILVERSUM

By courtesy of "The Netherlands Abroad" Association

werp, it has sugar-refineries, distilleries, and shipbuilding industries. Antwerp is a meeting-place of railway and steamship. Rotterdam has a large transit trade with Germany, but only 10 per cent. of its traffic goes by rail. On account of this transit trade many articles, such as textiles, iron and steel, and petroleum, figure in both exports and imports. Cane sugar, coconut-oil (from Java and Sumatra), cocoa, and drugs are imported as raw materials and exported as manufactured goods; for example, rum made from the sugar, margarine, spirits, and liqueurs, together with home dairy produce.

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The Hague (425,000), situated near the coast, is famous for the Palace of Peace and international conferences. Built on dry, porous soil, it enjoys a healthy climate.

On the eastern edge of the polders is Utrecht (152,000), half-way between the Rhine and Amsterdam. This town is famous for its peace treaty, and to-day is a centre of routes and an important market.

Other towns are Haarlem (115,000), the headquarters of the bulb industry; Nimegen, another treaty town, and Arnhem, both ports and market towns, standing at points where high ground lies close to one of the Rhine distributaries. Tilburg, near the Belgian frontier, manufactures woollen goods. Flushing and the Hook are chiefly passenger ports on the southern and northern extremities of the delta respectively.

CHAPTER XIII

GERMANY

THE republic of Germany extends over eight degrees of latitude (47° N.- 55° N.), from the Alps to the Baltic. But the climatic differences between north and south are less than the difference between Newcastle (55° N.) and Dijon (47° N.), because the higher land in the south counteracts the effects of lower latitude, and because Germany is mainly a continental country. For the north coast is that of an inland sea, and the west coast is short, being about 300 miles, though economically it is of much greater importance.

From east to west Germany, including the detached portion of East Prussia, extends over some seventeen degrees longitude (6° E.- 22° E.). In these latitudes that means a distance of about eight hundred miles, and, consequently, the climatic difference between the east and the west is great. In summer, the isotherm of 64° (the summer temperature of the London area) follows the Baltic coast, so that there is no appreciable difference of temperature in summer between the east and west portion of the northern plain. In winter, however, the isotherm of 32° runs from Hamburg south-eastward toward the head of the Adriatic. This means that while Western Germany escapes with about a month of frost in winter, it gets rapidly colder toward the east, where over two months of frost is the rule. In the south the effect of the mountains in lowering the temperature is felt more in winter than in summer. In brief, the range of temperature increases steadily eastward. The whole of Germany has warmer summers and much colder winters than Britain.

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As regards rainfall, Germany's north and west coasts get about 27 inches, which is 2 inches more than eastern England. Along the plain this decreases eastward. But on the westward slopes of the southern highlands it rises to 40 inches or more. Eastward the wet season occurs

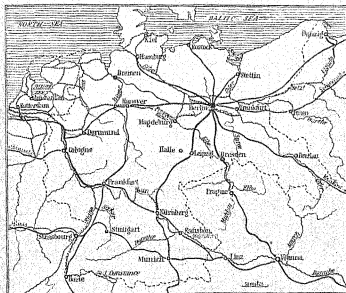


FIG. 81. GERMANY: RAILWAYS AND CANALS

chiefly in the summer, for the westerly winds, though light, penetrate farther eastward at this season, owing to the lower atmospheric pressure over the Continent. Much of the rain in the hot months, however, is chiefly due to rising air.

The chief natural divisions are (1) the Northern Plain, with the Baltic Heights, and (2) the Central and Southern Highlands, including (a) the Rhine basin, and (b) the Scarplands and Upper Danube basin.

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Northern Plain. Of the two regions this is the more extensive, and contains the larger part of the population. The Baltic Heights, which attain in places over 1000 feet, separate the coastal plain from the larger portion to the south. They consist of a mass of clay and stone fragments left by the ice-sheet of ancient times as a terminal moraine. These morainic hills are arranged in four zones roughly parallel to the coast, and are separated by valleys of old glacial rivers. These valleys, though marshy, provide east-west routes, and at places where the present northward-flowing rivers cross these valleys important towns have developed; for example, Frankfurt-on-Oder. Though comparatively low, the hills constitute difficult country, with hundreds of lakes surrounded by pine- and beech-woods and cultivated areas which are thinly peopled. Rye and root-crops are chiefly cultivated. The chief east-west valley, carved out along the southern edge of the moraine by flowing water, is clearly marked by the tributaries of the present rivers, the Netze flowing to the Oder, the Havel to the Elbe, and the Aller to the Weser. Great use has been made of this feature by linking them up with canals. But this valley is not favourable to other means of communication, owing to the number of swamps. Towns stand at the fords; for example, Brandenburg on the Havel, Kottbus on the Spree. The rivers Oder and Vistula cut important gateways through these hills to the Baltic, leading to Danzig (now a free city) and Stettin. It should be noted how the Baltic ports suffer by being ice-bound in winter. Frost lasts on the average 142 days at Memel (Lithuania), 81 days at Danzig, 61 days at Stettin, and 32 days at Lübeck. The ports, however, are not always closed for these periods. Several are kept open by ice-breakers. Note also the *Haffs*, lagoons filled largely with fresh water, enclosed by spits of sand, due to the action of wind and waves. Königsberg has a ship canal across the Frisches Haff, a distance of twenty-five miles, for the *Haffs* are encroached upon by deltas and silt. Königsberg

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is a growing port, with imports of coal and wood. But Stettin (250,000) is the chief Baltic port of Germany. It is farther south, and has important shipbuilding, sugar, grain, and tobacco industries. The coast of Pomerania is flat and monotonous. Sand-dunes shut off the lakes from the sea. In the shallow waters of the Western Baltic

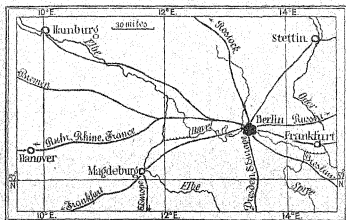


FIG. 82. THE POSITION OF BERLIN

occur the *Förden* of Holstein. These are wide estuaries at right angles to the coast; for example, Kiel Bay, on the lower valley of the Eider.

Berlin (4,024,000) occupies a central position in this plain. It is largely an artificial capital, and dates its prosperity from the opening of the canal connecting the rivers Elbe and Oder in 1688. It became the waterway centre of Brandenburg and of trade between Breslau and Hamburg. Population grew rapidly during the nineteenth century, due to developments in science and industry. Since 1871 railways have been built which connect it to all parts of Europe. Work out with the aid of an atlas the following great continental routes, and note how

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they cross at Berlin: Paris and Leningrad, London and Odessa, Stockholm and Rome, Lisbon and Vladivostok.

Manufactures, begun by Huguenots, but developed enormously as a result of science and technical colleges, now take the varied forms characteristic of capital cities. The chief are textile, furniture, and clothing industries. These are well served by the Saxony and Silesian coal-fields. The ring of suburbs around Berlin includes Spandau, Potsdam, and Charlottenburg.

The Elbe is the most important German river. From the industrial area of Saxony it passes through a fertile region round Magdeburg, which produces beet in large quantities and wheat, into a poorer heathland, fit only for rye and potatoes. Dark bread made from rye is a staple article of diet in Germany. Hamburg (1,128,000) is built at the head of the estuary, and its harbour is open all the year. It collects the manufactures of a wide area—that between Breslau and Berlin on the east, the Magdeburg-Stassfurt area on the south-east, as well as from Czechoslovakia (Bohemia) and Austria to the south. The Kiel Canal keeps Hamburg in touch with the Baltic. World-famous ships are built there. Its outport for transit trade is Cuxhaven. River traffic is enormous, and its exports include potash and chemical manures from the Hartz Mountain area, sugar-beet refined at Magdeburg, and general manufactures. Since 1870 it has become the greatest German port. It receives also large imports of wool and cotton, tropical products, and coal, and has a variety of subsidiary industries. Hamburg-Altona shares with Berlin-Charlottenburg the densest population of the German plain.

Bremen (nearly 303,000), on the river Weser, is fifty miles inland, but its outport, Bremerhaven, is nearer the open sea than Cuxhaven, the outport of the Elbe. Its sea trade in cotton and tobacco is greater than its river trade.

The North Sea lowlands are very monotonous. There are no hills or lakes, only occasional bogs, due to clay

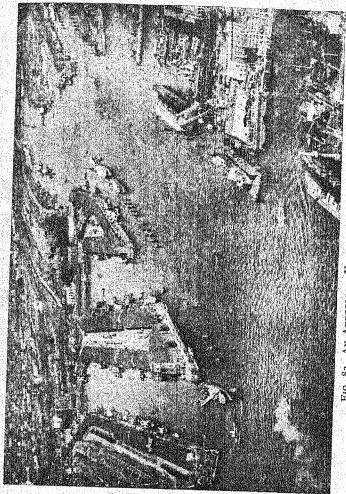


FIG. 83. AN AEROPLANE VIEW OF THE PORT OF HAMBURG
Aeroflms, Ltd.

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underlying the sand, the largest of which occur round the river Ems. The whole region is very poorly wooded. Wide moors, sterile and thinly populated, separate the bogs, but science and canals are improving the land.

The **Central Highlands** are most conveniently considered in relation to the rivers, which form the natural routes.

The Oder Basin. Rising in Moravia, the river Oder

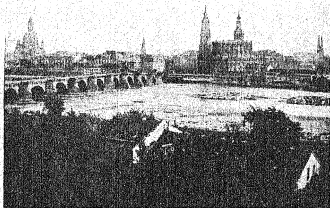


FIG. 84. DRESDEN

Photo E.N.A.

flows along the foot of the forested Sudetes Range. The plain of Silesia is an agricultural area, richest in the south-west, yielding rye, sugar-beet, flax, and wheat. Many small towns manufacture wool from local supplies. Breslau (600,000), at the gateway to the upper basin, manufactures textiles, and is the capital of the district. Frankfurt-on-Oder (71,000) refines sugar. Much traffic leaves the Oder here for Hamburg.

The Elbe Basin. Entering Saxony from Bohemia through a gorge between the Erzgebirge and the Sudetes,

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the Elbe enters the plain 1000 feet wide, flowing slowly. Coal, kaolin, and wool enable Dresden (619,000) and adjoining towns, notably Meissen, to manufacture pottery and textiles. But Dresden is more famous for its art galleries, public gardens, and the scenery of 'Saxon Switzerland.' Below Dresden potatoes, beet, and wheat are grown on the plain, but the right bank is forested and marshy. The Saxony coalfield lies in the basin of the Mulde tributary. Chemnitz (336,000) and Freiberg, manufacturing cotton and wool and silver respectively, are the largest towns. Zinc and lead are worked at Königshütte. In the Saale basin is Leipzig (679,000), the chief publishing town of Germany, a Government centre, and a town famous for its fairs. Halle is a university town. The mining area near the Hartz mountains produces lignite, copper, silver, and potash. Stassfurt has the most varied chemical industries in the world. Magdeburg, owing to its central position on the extreme bend of the Elbe, is of great strategical importance.

The Weser Basin. Formed by two main tributaries, the Werra and the Fulda, the Weser leaves the heavily forested highlands through a narrow gorge, known as the Westphalian Gate. The beautifully timbered houses of Hanover and Brunswick and all the Hartz towns reflect the forest wealth of this region. The forest influence accounts for the tanning and furniture-making at Fulda and other towns. Owing to a complicated political history there has been great competition between the towns. Those which command routes like Cassel (171,000), Göttingen, and Fulda have become important as educational centres and railway junctions.

The Rhine Basin. The Rhine valley in Germany consists of three portions: (a) the rift valley between Basle and Mainz; (b) the gorge between Mainz and Bonn; and (c) the lower plain, extending from Bonn to the Dutch frontier.

German sentiment centres on the Rhine. It is the

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constant subject of song and legend. From all points of view, its physical features, its historical associations, its military importance, or its commercial value, the Rhine is a rich river. In Roman times the Rhine was the frontier line; in the Middle Ages its basin contained the Empire of the Eastern Franks. Later it was once more a frontier between Napoleonic France and the Rhine Confederation; while the loss and reconquest by France of Alsace-Lorraine, and the towns which have both French and German names, all indicate its international character. This has been recognized by the Treaty of Versailles, which made the river international and placed it under the control of a Commission, on which not only the Rhine countries—Switzerland, France, Germany, Holland, and Belgium—but also Britain and Italy have seats.

The rift valley is from twenty to twenty-five miles wide and two hundred miles long. For five miles on either side of the main channel, artificially straightened, there is a maze of watercourses separated by marshes and subject to flood. Outside this belt the soil yields rich crops of wheat and maize, hops and tobacco, and on the terraced lower slopes of the steep escarpments facing inward the vine does well. The warmth of this sheltered valley is shown by the presence of Mediterranean trees like the almond and the chestnut.

The eastern wall of highlands (Black Forest to Odenwald) is cut by the rivers Neckar and Main, but from the western side only small streams descend. Most of the important towns lie along the east bank. The exception is Strasbourg, the French fortress, university, and manufacturing town referred to above. Freiberg (90,000) is an ancient university and cathedral town, with beautiful mountain and valley scenery. Not far away Karlsruhe (146,000), with engineering works, stands near the opening between the Black Forest and the Odenwald.

In the gap cut by the Neckar stands Heidelberg, and at the confluence with the Rhine, Mannheim. In similar

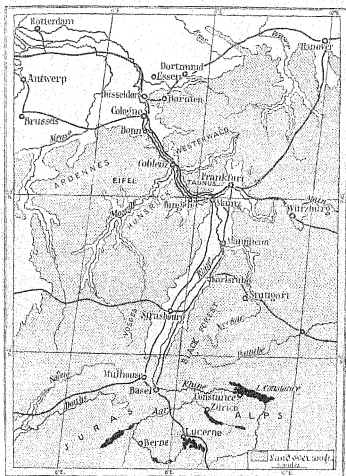


FIG. 85. THE RHINE BASIN

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positions on the Main are Frankfurt and Mainz. Heidelberg (73,000) is an old university town and agricultural market. Mannheim (247,000) is a river-port, divided into three parts by the rivers. Coal, iron, and steel goods, fertilizers, and wheat arrive there in barges up to 3000 tons, though 1500 tons is the standard size. The chief traffic downstream consists of timber from the Black Forest, bricks and stone for building, and salt from the valley of the river Neckar. Stuttgart (343,000), at the head of the Neckar navigation, is another university town on the Orient route from the Rhine to the Danube. It is a market for carved wood, clocks, and toys made by the peasants in the Black Forest, where there is abundant water-power for saw-mills.

Frankfurt-on-Main (540,000) is a great and historic meeting-place of routes from Berlin, Hamburg, and Bremen; from the upper and lower Rhine; from Vienna; and from Dresden and Bohemia. It is a great banking city, as well as a market for the rich agricultural regions round about. Its historic fair is famous. Frankfurt can be reached by barges of 1600 tons.

Mainz (108,000) is another important railway junction and manufacturing town, near the narrow entrance to the Rhine gorge. Bingen, with its vine-clad terraced hillsides, marks the entrance. The Rhine gorge, with ruined castles on every point of vantage, has roads, railways, and small towns along the narrow base of the hills on both sides. At Coblenz two tributaries, the Moselle from the west and the Lahn from the east, enter the Rhine. The Lahn valley is rich in minerals, iron, manganese, and lead. The Moselle forms the link with the Lorraine ironfield on the one hand and the Ruhr coalfield on the other. The Moselle gorge is also forested and rich with vineyards. Coblenz is not large, but it is an important centre for rail and river routes and for wine.

Bonn (90,000), a university town, stands in relation to Cologne (Köln) as Bingen does to Mainz. For two thou-

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sand years Cologne (700,000) has been important as the crossing-place of routes along the plain and the river. Its Gothic cathedral is the largest in Europe. Access to coal and raw materials results in prosperous manufactures—textiles, chemicals, perfume, and chocolate.

South-west of Cologne, near the Belgian boundary, and on a detached portion of the Belgian coalfield, is Aix-la-Chapelle (Aachen), where woollen manufactures are carried on.

The Ruhr Basin. Along the edge of the highlands north



FIG. 86. COBLENZ

Photo E.N.A.

of the Rhine is the rich coalfield of the Ruhr. Densely populated with clusters of towns, it raises annually a hundred million tons of bituminous coal, excellent for coke, and therefore for smelting. The chief centre is Essen (471,000), with Dortmund (456,000) to the east and the river port of Duisburg-Ruhrort (421,000) to the west. Other important towns are Düsseldorf (433,000), Elberfeld-Barmen (350,000), and Solingen (52,000) which lie south of Essen. This region is the chief iron and steel manufacturing area on the Continent. In addition to iron and steel works, these towns have developed

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specialized industries. Thus Solingen, with its cutlery trade, is the Sheffield of Germany. Dortmund (mining) and Düsseldorf concentrate on hardware; Elberfeld on chemicals and textiles; and Krefeld, across the Rhine, on silk.

The Danube Basin. The course of the Danube in Germany forms two sides of a flat isosceles triangle, with Ratisbon at the apex, and it flows eastward, away from industrial Germany. North of the river between the Vosges and the western corner of Bohemia (Fichtel Gebirge) stretches the escarpment of the German Jura (Swabian and Franconian). It is a limestone ridge, rising to 3000 feet in the south-west, but lower in the north-west, with its steep slope facing northward and its more gradual dip slope to the Danube. It is naturally a sheep-grazing country, with few towns and little agriculture.

The importance of the Danube valley as a route is shown by the position of Nürnberg, on a tributary of the Main. Here the Munich-Berlin route crosses the Vienna-Frankfurt route. Its medieval and artistic buildings remain amid prosperous modern industries—brewing, wood-carving, toys, and pianos. The canal from the Main, through Bamberg, past Nürnberg, to the Danube, reduces by half the cost of transport of timber from Bavaria, of wheat from Hungary, and of the products of industrial North and West Germany to Bavaria.

For the lower reaches of the Danube see pages 293 and 295.

The other chief towns stand on the Alpine tributaries of the Danube: Ulm (59,000), at the confluence of Iller, Augsburg (165,000), on Lech, and Munich (681,000), on Isar. All these are important route centres and market towns dating back to the Middle Ages. The Alpine Foreland is covered with pine forests, heathland, and pasture, on which cattle are reared. Toward the north hops and wheat are grown. Local industries are supplied with

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power from the rivers. Munich owes its importance to being the literal centre of the area. From the west, north, and east railways converge on it, including the Orient route, while to the south lies the important Brenner Pass, approached by the valley of the Inn. Its brewing industry is famous, but great use is made of water-power for engineering.

CHAPTER XIV

THE SCANDINAVIAN LANDS

DENMARK

DENMARK is a small but prosperous peninsular country, combined with a number of islands. The rolling lowland is open to all winds, and no part of the peninsula is more than forty miles from the coast. In winter winds from the cold east reduce its January temperature to 32° , while in summer English conditions prevail. The west is warmer and more equable than the east. Its rainfall, too, is low and distributed throughout the year as in eastern England. The glacial soil has been carefully improved by agricultural science, and most of the country is under cultivation. Crops of potatoes, oats, barley, rye, wheat, and roots occupy about half of the productive land, and rich pasture and meadows the remainder. The unproductive part, occupying about one-fifth of the total area (16,500 square miles), is marshland, sand dune, and peat bog. There are small areas of beech and other forests.

The occupations are dairy-farming, breeding of live-stock (cattle, horses, pigs, and poultry), and fishing. Grain and additional cattle foods are imported largely from the United States and Argentina. Co-operation and education have brought the dairy industry to a high pitch of perfection. Improvements in the breed of animals, in the skill of the people, and in the organization of marketing the products have resulted in great increase of production. Denmark now produces twice as much butter as Canada, and butter is the chief export. Bacon is also exported in great quantities, and fetches high prices. Butter to the value of over £18,000,000 and bacon to the value of over £25,000,000 is imported into Britain from Denmark

THE SCANDINAVIAN LANDS

annually. Millions of hens are fed on the by-products of the dairy industry, and yield an immense export of eggs. The pigs, too, are fed with dairy waste and beech-mast, while livestock (cattle and horses) and meat are exported in addition to satisfying home requirements. In 1929

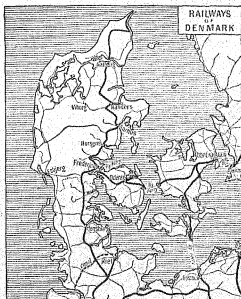


FIG. 87. DENMARK

there were 22,000,000 hens, 3,500,000 swine, 3,000,000 cattle, and over 500,000 horses in Denmark.

The west coast has slowly been uplifted, and is therefore smooth, with a shallow sea, raised beaches, and sandbanks. In the lagoons of the north-west, along the shallow coasts, and away on the North Sea banks fishing is carried on, with Esbjerg as the port. Esbjerg is also a packet station for England. The chief towns on the mainland are along the coast, the interior containing only villages. Aarhus

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(76,000) has the best position and has a good trade. Its imports are coal, iron, and timber.

The capital, Copenhagen (587,000), is on the east of the island of Zealand. Its position controls the entrance to the Baltic, and this accounts both for its prosperity and for the number of times it has suffered attack. It also accounts for the large *entrepôt* trade. The city, with its suburbs, contains more than one-fifth of the total popu-

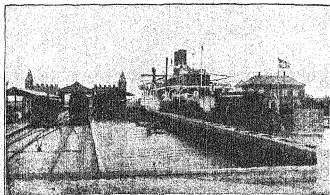


FIG. 88. TRAIN FERRY-BOAT

lation. It is the capital city in all senses, administration, education, society, commerce, and not least in the fine, well-kept houses observable everywhere.

The Danish islands are separated from the mainland and from Sweden by the Great and Little Belts and the Sound respectively. But journey by train from Esbjerg to Copenhagen and on to either Stockholm or Oslo is made possible by train ferry-boats. Road transport is chiefly used for trade purposes, and roads are well developed.

THE FAROE ISLANDS

The Farøe Islands, north-west of the Shetland Islands, are Danish possessions, and are composed of volcanic

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rock. The people engage in sheep-rearing, fishing, and domestic industries.

ICELAND

Iceland is now independent, but with a personal link to Denmark by having the same king. It is a land of plateaux, glaciers, lakes, and fjords, with active volcanoes (notably Mount Hekla) and geysers. Although nearly as large as England, its population is less than 105,000. Reykjavik (25,000), on the south-west coast, has a mild climate for its latitude on account of the winds from over the Gulf Stream Drift. Only about $\frac{1}{4}$ per cent. of the land is suitable for cultivation. The chief occupations are fishing and stock-raising. In addition to whale hunting the fisheries include the smaller fish, such as cod and herring. Salt fish is sent to Spain and the Mediterranean, and extracted oils to Britain. The animals (sheep, cattle, and ponies) are sent to Denmark and Britain (Leith and Newcastle)—the ponies for coal-mines in Britain. Coal, petroleum, food-supplies (wheat, sugar, etc.), textiles, hardware, and timber are imported.

GREENLAND

Greenland, the only colonial possession of Denmark, occupies a position midway between Iceland and Baffin Island. The island is more than twice the length of Great Britain from north to south, and nearly six times the area. It is an immense plateau, ranging in height from 10,000 to 15,000 feet. This plateau slopes downward to the coasts, and is covered with a great ice-sheet, except for a bare, rocky, coastal rim. The coasts are cut by fjords, and many glaciers reach the sea. The inhabitants are chiefly Eskimos, who live by seal-hunting and fishing. The climate is severe, being intensely cold in winter. The summer is fairly warm, and the days are long. The settlements are only Danish trading-ports.

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SCANDINAVIA

This massive peninsula, composed of ancient rocks similar to those of Scotland, has been subjected to earth movements, which have uplifted, folded, and faulted the western edge, while on the east the rocks dip gently in terraces to the Baltic. The plateau (5000 to 7000 feet high) extends northward from latitude 56° for over 1000 miles. In places its heights bear snow and ice, and have little vegetation. The fjords are a striking feature. Even to-day in the south of Norway there are numerous glaciers descending from the Jostedal Brae, near the Sogne Fjord. But in the Ice Age the ice was enormously thicker and more powerful, as it is in Greenland to-day. The glaciers then followed old river valleys, deepening them, planing the sides and removing all loose surface covering, which was carried out and dropped on the sea floor when the depth was sufficient to float the ice. This high, steep slope, facing the westerly winds, also has a heavy rainfall, increasing from north to south. It is not surprising to find that nearly three-quarters of the area of Norway is barren, and less than one-thirtieth can be cultivated. Even forests cover only one-quarter of the land area. The fjords penetrate in some cases a hundred miles inland, and their precipitous sides rising out of deep water offer a complete barrier to land communication north and south.

The Norwegians are largely individualists, with little opportunity for society, and are compelled to live hard, simple lives. Only round the south-west and at one or two favoured spots on the west coast are there any considerable towns. Roads and railways are few, but under the stimulus of the tourist trade are being rapidly extended and improved. Boats are the universal means of travel.

The coastal fringe of islands (the 'skerries') serve to shelter the belt of water between them and the mainland, which is, therefore, relatively calm, and affords good fishing-grounds.

THE SCANDINAVIAN LANDS

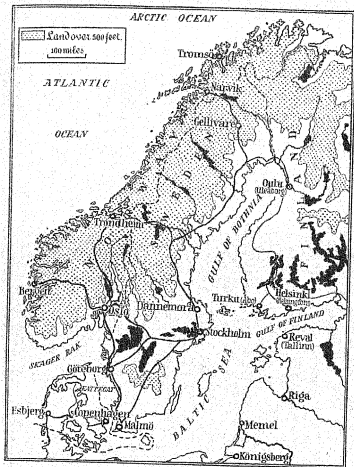


FIG. 80. SCANDINAVIAN COUNTRIES

On the east or Swedish side, however, the land is lower and less steep, better covered with soil and forests. The east side has a lower rainfall, longer, less impetuous rivers,

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a coast much less broken, and fewer islands. While the Norwegians are chiefly sailors and fishermen, the Swedes are settled agriculturists and foresters. In addition, mining and easier communication enable nearly half the population of Sweden to engage in manufacture and trade.

NORWAY

The population numbers nearly 3,000,000 (only twenty-two per square mile). A quarter of the population live in seventeen of the towns—each over 10,000 inhabitants—which lie along the coast, often on the *deltas* built out by rivers at the heads of the fjords. The only inland towns are near mines. Oslo (258,000), the capital, containing one-tenth of the whole population, stands on a fine harbour, and has access to the west coast *via* the Glommen valley to Trondheim. A more difficult route leads to Bergen. The plain around, cleared of forests and sheltered on the north and west, provides good cattle pasture, and crops of barley and oats. Smelting, by electric processes, of iron and copper pyrites, brought from Røros, ship-building, the manufacture of textiles and machinery, and milk-condensing are carried on. There are iron-mines at Kragerø, Varanger Fjord, and Arendal, and a paper-making industry at Drammen and Skien.

Oslo is of chief importance as a port exporting goods made in the industrial towns around it, as well as timber, butter, and mineral products, in return for foodstuffs, coal, oil, textiles, and machinery.

Bergen (91,000), north of the Hardanger Fjord, is the second city in size. It is the chief fishing port. Fishermen are away from here, as from other Norwegian homes, for long periods fishing for cod, herring, and mackerel in the North Sea. Bergen has a coastal trade, builds ships, especially motor-boats, for fishing, and has fish-curing and tinning industries.

THE SCANDINAVIAN LANDS

Trondheim (55,000), the crowning place of the king, and the old capital, is still important as a religious centre and a port for fishing and for tourists. There is a railway connexion with Sweden, as well as to Oslo, by two routes. Wood-pulp, timber, and mineral ores are exported.

Stavanger (44,000) is the fourth largest town, and stands



FIG. 90. A FJORD IN NORWAY

Photo Gram, by courtesy of the Norwegian State Railways

on the south-east coast, where it is lower than elsewhere. It has a big trade of tinned fish, herring, and sardines, and for this industry imports tin-plate and olive oil.

Narvik is the northern port, linked by railway with Sweden, which enables iron ore to be exported when the Gulf of Bothnia is frozen. At Tromsø, lat. 69° N., the sun is visible from the middle of May to the middle of July, during which period it never sinks below the horizon. Hammerfest, still farther north, is also visited by tourists, to see the 'midnight sun.'

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SWEDEN

Sweden is more favoured by Nature. The southern plains grow good crops of sugar-beet, potatoes, oats, barley, and even wheat. The dairy industry flourishes, and is increasing in importance. Over half of the total area is forested. The forests are mostly coniferous, and



FIG. 91. HARDANGER: A ROAD IN THE RØLDALSFJELD

The zigzags reduce the difficult gradient met with in all mountain passes.

Photo E.N.A.

cover the country up to a height of 3000 feet in the south. This limit sinks to lower altitudes northward. These forests make communications almost as difficult as the fjords in Norway. But the rivers are more serviceable, and water again provides the best means of getting about. Timber and wood-pulp, produced by electrical power, are the chief products. The timber is floated down to saw-mills on the coast. Machines also make doors and joinery. Cellulose, matches, charcoal, and bark for tanning are subsidiary forest products.

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But besides forestry, agriculture, and fishing, Sweden has steadily increased its manufactures. To-day about half the population is engaged in commerce and industries. There are vast deposits of valuable magnetic iron ore, chiefly round Dannemora, in the south, and Gellivare, in the north. The output is the third highest of any country

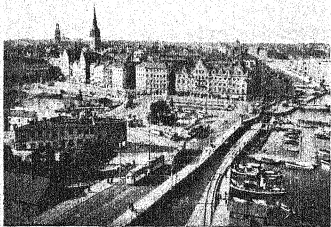


FIG. 92. STOCKHOLM

Photo E. N. J.

in Europe, and Sweden is the only exporting country besides Spain. Charcoal produces a high-quality iron, which is used for Sheffield cutlery. Some coal is mined in the south, near Hälsingborg. Copper, lead, silver, and zinc are also mined.

As in Norway, electric power is increasingly used for all purposes—smelting, machine-making, textile factories, and sugar-refineries. Telephones and electric light are universally used.

Britain takes nearly one-third of Sweden's exports, consisting of timber, butter, metals, electrical machinery,

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and paper, while coal, foodstuffs, cereals, and textile materials are imported. Göteborg (236,000) is the chief port and fishing centre at which textiles are manufactured. Stockholm (474,000) is the capital, but only the second port, on account of the freezing of Lake Mälär, on the entrance to which it is built. It is a beautiful city—"the Venice of the North." Northward from Stockholm a railway, which follows the foot of the uplands, extends to well within the Arctic Circle through Gellivare, the iron centre, to the Norwegian port of Narvik. Branches connect this line to the coast at many points. Uppsala (30,000), the old capital, university town, and ecclesiastic centre, is a junction on this route. An important branch turns north-westward to follow a mountain depression to Trondheim. Another main line to the west connects Stockholm to Oslo, and to the port of Göteborg, which is also served by another line from Stockholm to the south-west, and has branches to Norrköping and the south-east coast, to Trällebörg, Malmö, and Hälsingborg. The last two are train ferry ports for Denmark, and Trällebörg is such a port for Germany (a distance of sixty miles). Malmö (119,000), the third city of Sweden, has a considerable export of dairy produce, and is a great fishing port. Norrköping (61,000) is an agricultural market town, with important saw-mills and textile manufactures—chiefly cotton.

CHAPTER XV

THE BALTIC LANDS

FINLAND

FINLAND occupies the eastern coastlands of the Gulf of Bothnia. It consists of a plateau rising to over 3000 feet, high in the north, but low in the south, where the ice-sheet has planed down the surface, scouring out innumerable rock basins filled with lakes. This wonderful lake region is densely forested with pines, spruce, and fir. Forests constitute the chief source of wealth. They cover over 90,000 square miles, much more than half the area of Finland. Peat bogs extend over thousands of square miles.

Twice as long from north to south as from east to west, the area of Finland is considerably more than that of the British Isles, but there are only about twenty-five persons per square mile. Seeing that three-quarters of the country is either forest, lake, or bog, it is not surprising that the population is small. Owing to the long, dark winter and the short summer there is little land suitable for agriculture, or even good pasture. For the rainfall is low—viz., about 25 inches, and this falls chiefly from July to September. Although it has so many lakes and considerable coast-line along the Gulfs of Bothnia and Finland, as well as on the north coast, temperatures are not modified as much as might be expected, owing to these inland seas being frozen five to eight months in the year. The average annual temperature is 37° F., which is fairly high for that latitude. There is little difference in temperature between the north and south. As in Scotland and Denmark, this hard climate has led to skilful farming and to co-operation

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in order to obtain the best possible return from the land, forestry and agriculture being the chief occupations.

Rye, barley, oats, and even a little wheat are grown. Rye bread, oat cakes, and potatoes form the chief articles of diet, together with fish—herring from the sea, perch and trout from the lakes, and salmon from the rivers. Other crops of lesser importance are sugar-beet, hemp, and flax.



FIG. 93. IN THE FORESTS OF NORTHERN EUROPE

A chain of logs being floated down a river in Finland.

Photo National Museum of Finland

Cattle are grazed for the growing dairy trade, and large amounts of butter are exported. The south-west is the chief pasturing and farming district.

Minerals, in the form of iron, copper, and stone (granite), are worked, but manufacture is dependent on water-power and electricity. Nine-tenths of the foreign trade of the country is in forest products, sawn timber, tar, turpentine, pulp, and paper. But electric power is used also for the manufacture of leather and metal goods, textiles, sugar, and tobacco, raw materials for which are chiefly supplied by imports. All necessary coal is imported.

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Communications are well developed. There are over 3000 miles of State railways, which roughly follow the line of moraines, with branches to the ports of Viipuri, Kotka, Helsinki, and Turku (Åbo), on the Gulf of Finland, Pori, or Björneborg, Vaasa, and Oulu, on the Gulf of Bothnia. Roads are good, and rivers and lakes abound. The lakes are connected with each other and the sea by canals.

The capital city and port is Helsinki or Helsingfors, (227,000). It has an excellent harbour, which is ice-bound, however, for several months. One-third of its trade is with Britain, forest and dairy produce being exchanged for coal, machinery, and textiles. Germany, however, sends more imports than Britain, and the United States sends large supplies of wheat and meat. Local industries include machinery, carpets, tobacco, and distilling.

Viipuri, or Viborg (54,000), is the second port, with good communications with Russia. Hanko, or Hangö, exports butter, and, being the most southerly place in Finland, is a holiday resort. Its harbour is ice-free.

Turku, or Åbo (64,000), the old capital, can take only small ships, but with iron ore near, maintains shipbuilding yards and textile and tobacco factories with imported materials. Oulu, or Uleåborg (23,000), on the west coast, is a port for forest products. The chief inland town is Tampere, or Tammerfors (54,000), on a lake peninsula, which has textile and paper industries; they originally relied upon locally grown flax and hemp, but now on imported cotton.

The Finns are a fine, athletic people, hardy, industrious, and alert, Protestant in religion, and capable of using their independence to the full. In the coast towns there are many Swedes. In the north live the Lapps, leading a nomadic life. Wealth with them is represented in terms of reindeer herds, whose wanderings they follow, and from which they obtain all the necessities of life—milk, meat, and clothing, as well as means of transport.

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ESTONIA

The population numbers a little over a million. The people are similar to the Finns in many respects. Their country is largely fenland, with low plateaux densely forested. Nearly half its area is pasture-land, and three-quarters of the population is occupied with farming. Agricultural land, under potatoes, rye, barley, oats, wheat, and flax, amounts to a quarter of its area. Its flax crops are famous for strength and length of fibre. Potatoes in the north are such a valuable crop that it is State-controlled.

The other industries are connected with timber and distilling (from potatoes). Estonia benefits from Russian trade, but its independence has increased trade with western countries. Dairy products, potatoes, flax, and timber are the chief articles of export, while coal, fertilizers, and machinery are imported.

Reval, or Tallinn (132,000), the capital and port, has advantages over the ports of Finland. Nearer to markets, much less ice-bound, comparatively free from fog, its deep harbour and up-to-date equipment give it most of the trade. It has regular steamer services to the chief Baltic ports, to Liverpool and Hull, and to France (Dunkirk). Baltiski, or Baltic Port, is thirty miles west of Reval and connected by railway. Near the Russian frontier is Narva, with textile factories, using water-power from waterfalls on the river Narva, draining Lake Peipsi, or Peipus.

LATVIA

Latvia is rather smaller than Scotland, and has a population of less than two millions, a sixth of which live in Riga, the capital. The country is similar to that of Estonia, with pasture and agricultural land, but also many swamps, peat bogs, and forests on higher ground.



FIG. 94. A COUNTRYSIDE TYPICAL OF ESTONIA, LATVIA, AND LITHUANIA
By courtesy of the Estonian Legation

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There are no minerals, and farming is again the chief occupation.

The mouth of the Dvina formerly brought it great trade in timber and grain from Russia, and now supplies great water-power for such industries as shipbuilding, saw-milling, furniture-making, and leather- and paper-manufacturing. But manufactured goods have chiefly to be

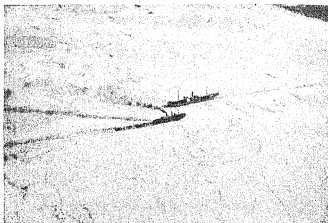


FIG. 95. SHIPS PLOUGHING THEIR WAY THROUGH ICE IN THE GULF OF FINLAND

By courtesy of the Otava Publishing Company, Helsinki

imported, together with tropical foodstuffs, coal, and tobacco. The main crops are rye, barley, oats, potatoes, and flax. The chief exports are timber, flax, and butter.

Riga (339,000) suffers from the strong ice which blocks the Gulf. It has, however, important railway connexion with Russia, and is the next port to Leningrad in the East Baltic. It is the largest town of the new Baltic republics. Other timber ports connected by railway with the capital are Liepaja, or Libau, and Ventspils, or Windau. Liepaja is practically free from ice, and possesses a splendid naval harbour.

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LITHUANIA

Lithuania is a plain, with many lakes, no part of which is over 1000 feet, and constitutes the basin of the river Niemen and its tributaries. Half its area is under cultivation, producing mainly crops of potatoes, cereals, and flax; pastures occupy one-quarter and forests one-sixth of the total area. Ninety per cent. of the population are agriculturists. The other occupations are the making of foodstuffs, brushes, and furniture, also brewing and tanning. Unlike their neighbours, they are Roman Catholic in religion, and there are also differences of race and language. Half the flax grown and some of the wheat is exported, but nine-tenths of the other cereals are utilized. On the pastures there are over 1,000,000 each of cattle and sheep, and nearly as many pigs. Thus hides, hams, butter, wool, live stock, and eggs are available to exchange for textiles, agricultural machinery, fertilizers, and foodstuffs.

The resources of the country were severely depleted during the War, and Vilna, the old capital, has been seized by Poland. The present capital is Kaunas, or Kovno (96,000). It is the centre of the above industries, and in addition has cement- and glass-works. Railways link it to Vilna, Berlin, Leipaja, or Libau, and Memel. Memel, or Klaipeda (36,000), the port—on the Kurisches Haff—has cellulose and other industries. It is also used by Poland.

POLAND

Geographically this new republic represents, with additions, the old kingdom partitioned between Russia, Germany, and Austria. Roughly it is the basin of the river Vistula, together with the upper valleys of the rivers Pripet and Dniester. In the south of Poland are mountains and uplands; in the north morainic hills; and between these a central lowland plain, with extensive marshes (Pripet) in the east. Poland therefore retains all

its former difficulties. (a) Its east and west boundaries are not well defined. Its northern boundary is better, following the morainic hills with a corridor through to the sea, on which the new port of Gdynia has been built, for Danzig, at the Vistula mouth, is now the capital of the small Free State of Danzig. Only on the south, along the Carpathians, is there a natural barrier. (b) Racial differences add to the difficulty of government. The Slavonic Poles live chiefly in the western half, but there are 'island' towns, with German populations. The eastern half contains a large proportion of Jews, intermixed with Russian peoples, and more German 'islands.' (c) The population is not yet well educated. These factors result in foreign control of most of its industries, and in a large standing army, which involves great financial waste. (d) Its central position and extensive area—more than the British Isles—demand good railways and navigable waterways, which need considerable development. (e) But there is neither sufficient coal nor water-power for these industrial needs. Finally (f) the severe climate, with its extremes of temperature, hinders output. The winters are intensely cold, and the rivers are frozen from two to three months, yet it is hot enough in summer to ripen the vine and maize.

On the other hand, as the gateway to North Europe, its transport trade is bound to be important, and it has great resources of forests and mineral products. Potash is worked at Kalisz, near the western border. But the bulk of Poland's mineral wealth lies in the south-west, round Kraków, or Cracow, where good steam coal and iron are found and easily worked, as well as zinc, salt, and manganese deposits. Thus Poland is able to maintain an important metal industry. The chief metallurgical towns are Królewska Huta, or Königshütte, Katowice, and Tarnów. In addition there are chemical manufactures and cellulose and paper factories. But goods have to be carried a long way to reach a port.

Poland is also rich in oil, which occurs in East Galicia

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near Lwów, or Lemberg and Kraków. The oil is obtained at Borystaw and refined at Drohobycz, south-west of Lwów.

Forest products are very important. Forests occur in two belts. (a) On sandy soils in the moraine country of the north, where the characteristic trees are coniferous. Crops



FIG. 96. POLAND.

From "The New World: Problems in Political Geography" by Isaiah Bowman (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

of rye, oats, and sugar-beet are grown on the clay soils of the moraine country, but there are many lakes and marshes, and the population is small and scattered. (b) On the uplands of the south, where the forest is composed of deciduous trees—elm, beech, oak—though here too, in clearings, agricultural and pasture-land is found. Being

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near the industrial area, the timber finds a ready market for mines, for houses, as well as for export by river.

Agriculture is the main occupation, although the soil is poor and the climate extreme. The most fertile and, climatically, the most favourable part is round Poznań, or Posen, in the west. Here potatoes, rye, beet, oats, and wheat yield rich crops. The potato crop gives rise to widespread distilling. Most of the great central plain of Poland is unforested, and utilized for farming and pasture. Beet is perhaps the most important crop for export trade, but cereals and potatoes occupy larger areas.

Many millions of cattle, pigs, horses, and sheep are reared, yielding valuable food and other products for industry.

Along the Vistula valley stand Warsaw (1,109,000) and Toruń, with Łódź (606,000) to the south-west and Poznań (248,000) to the west, on the Warthe. Łódź is the most important manufacturing town, especially in textiles. There is a variety of industries in most of the large towns, centring chiefly round distilleries, sugar-refineries, leather and hardware factories. Raw cotton is imported.

Warsaw, the political and commercial capital, is well placed, in the centre of the plain. Railway rolling-stock, textiles, and leather goods are manufactured. More canals and improved river transport are needed to strengthen the trade of the capital. All traffic between the Baltic and Black Seas must pass through Poland. Note how routes between Russia and Germany centre upon Warsaw:

Leningrad *via* Pskov, Vilna, *Warsaw*, Moravian Gate, Vienna.

Moscow *via* Smolensk, Minsk, *Warsaw*, Toruń, Berlin.
Kiev, the Ukraine capital *via* Kowel, Lublin, *Warsaw*, Berlin.

Poznań is an old market town of a rich agricultural area. Lwów is well placed on high ground, separating the Baltic and Black Sea rivers, giving it command of routes.

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Kraków, once the capital, is on the route between the Vistula and the Moravian Gate. It has the advantage of local supplies of salt and oil.

THE BALTIC

The Baltic is a shallow sea, seldom more than 600 feet deep, and served by many navigable rivers—Dvina, Niemen, Vistula, and Oder. Being almost entirely enclosed, tides are slight, and deltas and lagoons abound. With a large supply of fresh water and little loss by evaporation due to the low temperature of the air, its salinity is low, being only one-third that of the Mediterranean. The surplus water leaves as a surface current into the North Sea. The heavier, saltier Atlantic current enters along the sea floor. The whole sea is subject to occasional ice, and in some parts frost closes it for from five to eight months. It provides a valuable means of access to the heart of the continent, and to some extent reduces the extremity of the climate.

CHAPTER XVI

THE HEART OF EUROPE

CZECHOSLOVAKIA

THIS new republic is peopled chiefly by Slavs, who are Roman Catholic in religion. As in Poland, German groups appear here and there, particularly along the margins of the country, and numbers of Russian Jews live in the extreme east. It comprises the compact highland region of Bohemia, which is its most valuable territory, the south slopes of the Western Carpathians, and a portion of the Danube plain, territory in all of about the same area as England and Wales. Mountainous though it is, and with no coastline, the independent spirit and sense of nationality which survived through a long period of domination is serving to triumph over difficulties and to make the utmost use of the varied natural resources of the country. It is pre-eminently an agricultural and forest country, but its manufactures have prospered and are very important. The bulk of Czechoslovakian export trade goes to Rotterdam and Hamburg. But there is a scheme to link the Elbe and the Danube.

Bohemia. This rectangular block, mainly of Archæan rock, forms the centre of peninsular Europe. Bounded by the Bohemian Forest, the Erzgebirge, the Sudetes, and the Moravian Hills, all thickly forested, its rivers drain to the centre, forming the Elbe, which leaves the plateau by a rugged gorge. The valleys of these main tributaries lie along the diagonals of the rectangle and facilitate communication. Prague, or Praha (677,000), has a central position near the confluence of the Moldau with the Elbe. It is an agricultural market, for nearly half of Bohemia is

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arable land. Wheat and sugar-beet are grown in the north on the richest land, while the poorer land to the south produces rye, oats, and potatoes. The vine and hops of excellent quality are also grown. With abundant supplies of coal, iron, and other minerals, it is also a great manufacturing centre, notably for machinery, textiles, and hardware.

Rich coalfields occur in the north-west, lignite round



FIG. 97. THE RIVER ELBE AT TESCHEN

Photo E.N.A.

Karlovy Vary, or Carlsbad, and Teplice, steam coal in northern Moravia and round Brno, or Brünn, Praha, and Pilsen. Plzen, or Pilsen (108,000), half-way along the valley between Praha and a pass in the Bohemian Forest, is a famous brewing centre, with abundant supplies of barley (for malt) and hops of highest quality. World-famous Bohemian glass and porcelain is also made in the towns of the north-west from local potash, quartz, and kaolin. Sugar and brandy are extracted from beet and potatoes. Other manufactures are widely spread in a number of small towns, with no particular specializations,

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except that Liberec, or Reichenberg, in the north, is the centre of the woollen and cotton trade. Cotton is imported from the United States *via* Bremen, and from Egypt *via* Trieste. Linen, jute, and silk are mainly made in eastern Bohemia. Jachinov, in northern Bohemia, is famous for radium. Silver, lead, copper, and tin are also found in the mountains.

Cattle and pigs are bred around Praha. Dairy farming is highly organized. The numerous leather factories in Bohemia and Moravia produce considerable quantities of shoes, machine bands, and gloves for export.

Moravia grows wheat, barley, and fruits, including vines, in the plains, and flax on the cooler, higher slopes. There are some four hundred fruit-preserving factories. Brno (222,000), an ancient natural fortress, now makes iron and steel, and cotton and woollen goods. Horses and cattle are reared for transport, and also for leather. Brno is on the important route from Vienna to Silesia called the Moravian Gate.

Bratislava, or Pressburg (93,000), a river port of the Danube at the point where it flows close to the Carpathians, is another ancient market centre on the route from Germany *via* Praha to Budapest and Constantinople.

Slovakia. One-third of the area of Czechoslovakia is forested, and the Carpathian provinces are particularly rich in forest. Beech is abundant, but oak as well as firs abound. Water-power enables this timber to be sawn cheaply for all kinds of commercial purposes—cases, pulp, cellulose, paper, and bentwood for furniture. These industries are carried on in the homes as well as in factories.

But the Carpathian provinces, unlike Bohemia, where dense population is found, are a thinly populated, undeveloped region, although precious metals, copper, lead, and salt are found there. The peasants, though isolated and illiterate, produce excellent hand-made and embroidered fabrics. Košice (Kaschau), on the Hernad valley route, is a centre for the iron trade, and has saw-mills and

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paper-mills. In the sheltered valleys tobacco is cultivated, and vines do well on the lower southward-facing slopes.

Where faulting has occurred in the mountains warm mineral springs are found. Around these springs are famous spas—Carlsbad, Marienbad, Fransensbad, and others—which attract wealthy tourists.

AUSTRIA

The present republic contains 6,500,000 inhabitants, who were mainly engaged in manufacturing industries in the former empire. Over half of this population lives on the small portion of plain east of Vienna, and nearly one-third lives in Vienna itself. Though qualified for industrial callings, they at present lack the necessary materials. The country is dependent chiefly upon outside supplies for coal, and to a large extent also for copper, chemicals, oils, and wool. As only about one-quarter of the land can be cultivated, and as this yields only one-quarter of the home needs of wheat, maize, barley, and rye, Austria's only means of exchange lies in the development of its water-power, its timber resources, and its minerals.

Most of the country lies among the eastern valleys of the Alps, and the swift-flowing rivers the Inn, Salzach, Enns, Mur, and Drave have vast resources of electric power. Forests cover 40 per cent. of its area, and though these are often difficult to work, timber products constitute the most important export. Raw timber goes to Italy, sawn wood to adjoining countries, and large quantities are used for pulp, cellulose, and paper-making.

As to minerals, Upper Austria, Styria, and Carinthia contain a large amount of iron ore and some lignite at Leoben and Graz. Austria has forty-four lignite mines and five anthracite mines, which produce three and a quarter million and nearly a quarter million tons respectively, but it is necessary to import over 1,000,000 tons of coal, and this comes from Czechoslovakia and Poland.

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Iron ore is exported to Italy and Czechoslovakia. In addition, there are some gold and silver resources near Salzburg. Some copper is produced in Styria and Carinthia, but is also imported. Nickel, cobalt, and bauxite are also present. Graz (153,000) and Klagenfurt (27,000) are the chief centres of the metal trade, for the preparation of

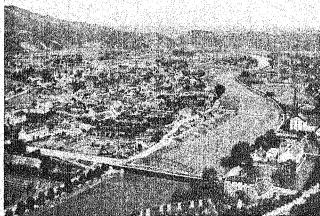


FIG. 98. GRAZ

Photo E.N.A.

pig-iron, and the manufacture of agricultural and electrical machinery, cutlery, and tools.

Abundance of water-power favours textile industries. In the cotton trade spinning is important, and much yarn is exported. Wool, silk, hemp, flax, and jute are imported for the making of hosiery, lace, and knitted goods. The Tyrol has many cotton and silk factories. Minor industries include motor-cars and musical instruments.

Most of its agricultural area is used for crops of rye, oats, wheat, and barley, but large quantities of potatoes and turnips are also grown. The cereal crops are supplemented

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by imports from the United States, Hungary, and Yugoslavia. The pasturing of cattle is growing in importance, and the manufacture of high-grade leather goods is very important.

The railways of Austria were developed to link the industrial area round Vienna with the areas of Bohemia and Hungary, which produce raw materials, and with the ports of Fiume and Trieste. But Austria is now like Switzerland, without coastline, and its railways become of similar importance to the Swiss railways for transit trade, chiefly east-west.

Vienna (1,855,000) is the fourth largest city of Europe, and occupies a most important position on the following routes.

- (1) *Via* the Austrian gate to (a) Ulm, the Rhine, and South Germany; (b) Ratisbon, the river Main and North Germany; (c) Praha, Dresden, and North Germany.
- (2) *Via* the March valley and Moravian gate to the river Oder, the Baltic, and Russia.
- (3) *Via* the Carpathian gate to Hungary, the Black Sea, and Constantinople.
- (4) *Via* the Semmering Pass to (a) Trieste, the Adriatic, and Italy; (b) the Brenner Pass and Italy.

Vienna has always been a great centre of culture—music, painting, and medicine. Its colleges, museums, and Government buildings are famous. It is a city of beautiful buildings and parks. The luxury industries of this capital have declined, but textiles, clothing, piano- and furniture-making, as well as shipbuilding for Danube navigation, continue.

Austria also has wealth of scenery, and the tourist traffic has gained an added importance, especially in the Tyrol. Much of the Tyrol has been lost to Italy, but the Austrian Tyrolese remain a most hospitable people; their arts and crafts, their music, and their high character add to the

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pleasure of their picturesque surroundings. Innsbruck (56,000) is the chief centre, and a market for dairy produce and carved wood. It stands on the Inn at the northern end of the Brenner Pass, which links the Inn and the Adige river valley routes. It is thus a junction between

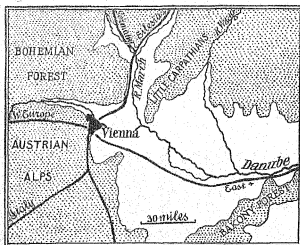


FIG. 99. THE POSITION OF VIENNA

Switzerland (Zürich), Germany (Munich), and Italy (Verona).

SWITZERLAND

Switzerland is chiefly an Alpine country. Three-fifths of the area consists of the central Alps. The remainder is partly plateau and partly the Jura range. The St Gotthard Pass forms a convenient starting-point for a brief description of the Alpine portion. North-east and south-west of it, in a great longitudinal valley, are the rivers of the upper Rhine and Rhône. At right angles to this line are the valleys of the Ticino and Reuss. Both the

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Rhine and the Rhône, before leaving Swiss territory, turn at right angles into transverse valleys, to enter Lake Geneva and Lake Constance respectively. The Rhône separates the Pennine Alps from the Oberland (Bernese Alps). At the western end of the Pennine Alps is Mont Blanc, where the boundaries of France, Switzerland, and



FIG. 100. MONT BLANC

Photo E.N.A.

Italy meet; at the eastern end the Monte Rosa group towers up nearly as high—viz., three miles. Between them stands the famous Matterhorn and many other beautiful and impressive snowy summits. In the Oberland the Jungfrau and Finsteraarhorn are famous amongst a host of others. In each case the range is cut into transverse spurs and valleys by northward- and southward-flowing tributaries. Many of these are hanging valleys—i.e., the lower end of the tributary valley does not join the main valley at the same level, but is higher and overhanging. The glacier streams which flow down these

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tributary valleys, therefore, fall to the plain below in beautiful cascades. In these high valleys, often close up to the snout of the glacier, hotels are situated. Zermatt, in the Pennines, and St Moritz are typical tourist centres in this type of valley. Similarly, to the east of the St Gotthard, the Rhine separates a portion of the Lepontine



FIG. 101. THE JUNGFRAU AND OTHER PEAKS OF THE SWISS ALPS

By courtesy of the Swiss National Tourist Office

Alps from the Glarus range, and shortly after entering its transverse valley near Chur becomes the boundary between the Vorarlberg of the Austrian Tyrol and Switzerland. Lakes fill the lower portions of most Alpine valleys; Lakes Geneva, Neuchâtel, Thun, Brienz, Lucerne, Zug, Zürich, and Constance are the largest on the north, Lugano and the other Italian lakes on the south. These occupy either rock basins produced by earth movements, or valleys deepened by ice with morainic dams. In some cases both factors have been at work.

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The longitudinal valleys of the Alps make communication east to west relatively easy, while north to south traffic is difficult and confined to passes. The Alps are the most highly developed mountain system in the world. As a result, the mountainous part of Switzerland has been easy to defend, and yet capable of supporting a considerable population. To the visitor it appears more densely populated than it is, for the peasants change their abode with the seasons. In the winter even the valleys are snowclad, and life is confined to the home; carving, hand-made lace and silk-work, spinning, weaving, clothes-making, and school lessons keep every one busy. When the snow disappears from the lower slopes about the end of April, the cattle are turned out to graze, roads are repaired, and where possible crops planted. By May the sun and the dry *Föhn* wind, which has been warmed by compression as it descends the valleys, have cleared the snow up to the forest belt. Here in the clearings there are rich pasture lands, called *Mayen* (May pastures), with houses for summer use. But as soon as possible the cattle and goats, with their tinkling bells, are driven up through the forest to the high pastures, the 'alps,' so that the *Mayen* may grow the hay crop, upon which the winter fodder-supply depends. On the high 'alps' more huts are built for the men who will tend the cattle through the summer and make cheese, for the milk cannot be sent down to the village. Meanwhile the women and the rest of the family are busy with the hay crop, which has to be carried on their backs down to the valley. The cattle reach their highest grazing lands in August, and then gradually withdraw again as snowstorms occur, coming back to stay on the *Mayen* till October, and then they go down to the stalls.

The succession of vegetation is as follows: vine and fruit-trees, together with walnut and chestnut, on the more fertile sunny slopes facing south; then from 2000 feet to 4000 feet crops and hardier trees like the beech and the

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oak; from 4000 feet to 6000 feet forests of pines and firs, with some extensive meadows where the forest has been cleared; lastly the 'alps.' There are no trees above 7500 feet. Alpine vegetation extends between 8000 feet and 9000 feet. All these zones climb higher on southern slopes than on the northern. The forests not only supply wood for



FIG. 103. VIEW OF THE BETTMER ALP, FLETSCHHORN, AND MISCHABEL.

Photo E.N.A.

houses, for fuel, and for carving, but serve as a defence against avalanches.

The chief towns occupy the plateau region between the Alps and the Jura. They lie along three main lines. The central one has the most important towns—Geneva, Lausanne, Berne, Zürich. The second follows the foot of the Jura through Neuchâtel and Biel (Bienne). The third follows the edge of the mountain area. Lausanne belongs to this line, as well as to the central one. Lucerne, Thun, Zug, and St Gallen are more clearly towns situated at the foot of important valleys.

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Although Switzerland is without coal or iron, it is essentially a manufacturing country, using electric power generated by the abundant water-supply. The plateau provides easier communication and more stable conditions of water-supply and production. So that here is found the flourishing industry of machine-making. The making of

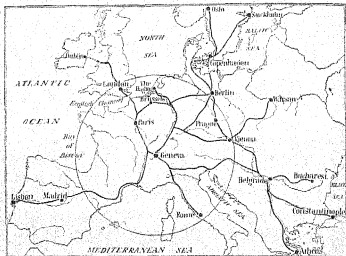


FIG. 104. GENEVA AS THE DIPLOMATIC FOCUS OF EUROPE
The circle has a radius of 500 miles, with Geneva as centre.

electrical machines is very important, but textile and hydraulic machines and tools are also made for export to Britain, the United States, and Japan. Millions of watches and clocks are also made. Zürich (249,000) is the engineering centre and the largest town. Textile industries, relying on raw silk received by train from Italy and British-made yarn and American cotton brought by river to Basle, have increased during the last twenty years. The textile industry flourishes at Zürich, Aargau, and at Glarus and St Gallen, nearer the mountains. Basle

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(147,000) is a very important route centre. Its position on the bend of the Rhine at the junction of three frontiers, and also of river and railway traffic, makes it the most important commercial centre. Chemicals, textiles, and machines are the manufactures. Lucerne (47,000), on the Lake of the Four Cantons (Lucerne, Schwyz, Uri, and Unterwalden), is a popular holiday centre. The beautiful city of Berne (111,000), in a central position on the swift-flowing Aar, is the capital. Chocolate, condensed milk, butter, and cheese are the chief industries at Berne, use being made of the pastoral products of the country. Gruyère is famous for its cheese.

To the west, on Lake Geneva, stands Lausanne (76,000), occupying a central position on the convex northern shore. Across the lake the mountains rise majestically. It stands, therefore, on the edge of the mountain country to the south and east, with the open plateau to the west and north. Lausanne attracts many visitors not only for its scenery and climate, but for educational purposes. It is the fifth town in size, and the industries of condensed milk, watchmaking, and chemical manufacture established there are increasing in importance.

Geneva (143,000), at the western end, is, however, the most important city for international affairs. The Rhône, having dropped most of its load in the lake, flows through the city, a clear, navigable waterway.

Geneva is excellently served by railways to all the European capitals: to Paris and London by several routes, but chiefly *via* Pontarlier and Dijon; to Brussels, The Hague, and Berlin *via* Basle and the Rhine; to Praha, Vienna, and Budapest *via* Zürich and St Gallen; and to Rome *via* the Mont Cenis Pass. It is, therefore, a centre of learning and conferences, particularly those of the League of Nations. Its watch-making industry is also famous.

The Jura region consists of parallel ridges and valleys. They are young mountains, 3000 to 4000 feet high, com-

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posed of limestone, each ridge being an upfold (anticline) and each valley a downfold (syncline). Only the top strata have been eroded away, so that transverse routes are few, and these have to cross inward-facing escarpments. The range is pine-clad to its summit and thinly populated. Lumbering and the pasturing of carefully tended cows and goats, with their melodious bells, are the chief occupations. There are saw-mills in every village. In the

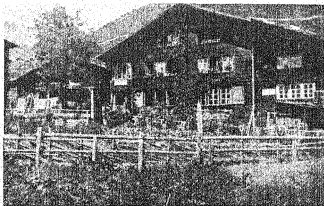


FIG. 105. A HOUSE BUILT OF WOOD IN A SWISS VALLEY

homes of the peasants watch-making for the markets at Geneva and Neuchâtel provides the chief employment. La Chaux-de-Fonds is the chief industrial centre. Pontarlier, on the west, and Neuchâtel, on the east, command the chief routes across the region, but these both lie clear of the mountains. The Jura region is also one much visited by tourists.

There is no Swiss language. The larger part of the people speak German, particularly in the north, and are mostly Protestant; the western area uses chiefly French, the Alpine peoples French or Italian, and in both these parts are mostly Roman Catholics. But the standard of

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education is good, and international traffic necessitates a knowledge of all three languages. The Swiss are a frugal, industrious, and hospitable people, and these qualities enable them to overcome the difficulties of their country



FIG. 106. ST MORITZ IN WINTER-TIME

Photo Othmar Kutz

By courtesy of the Swiss Federal Railways

and to turn to good account the quarter of it which is useless for production, as exemplified by the exchanging of granite for coal and grain with the countries which lack stone, like the Low Countries. The capital invested in the building of hotels and mountain railways, to provide for the thousands of tourists who visit the mountains in both summer and winter, brings a good return.

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HUNGARY

In marked contrast to Austria, Hungary is almost entirely a plain, which is treeless, and without valuable metals, except some iron and satisfactory supplies of coal. Encircled by mountains (not, however, as boundaries), and lying in the heart of the continent, Hungary has a climate which is extreme, with two months' frost in winter, a high summer temperature, between 70° and 80° F., and a low rainfall of about 20 inches, falling chiefly in spring and autumn. But though the climate is dry, Hungary is abundantly supplied with water. The Danube, the Drave, and Save, on its right bank, and the Theiss, on the left, are all subject to spring floods from melting snows. The whole country is thus in character and climate an outlier of the great steppes, and in the *pusztas* (wide grasslands) the Magyars lead the typical, herd-following lives of steppe-dwelling peoples. Horses are highly prized, and have first use of pasture; cows and sheep follow. As summer advances higher levels to the north are resorted to. The home is a tent, and everything is transportable. In winter settled quarters are selected, and the reduced herds carefully tended under shelter. But, by means of irrigation, crops of wheat, maize, and tobacco are obtained, and on the sunny slopes the vine does well. Tokay is the wine market. Debrecen (109,000), near the eastern boundary, well clear of the Theiss, is a railway centre and a great market for cattle, grain, and tobacco. Szeged (125,000), in the south, is another such town, which sprawls over the plain around its large central market. Iron is found near by. For the rest, Hungary is essentially an agricultural country. The chief crops in order of yield are potatoes, wheat, maize, rye, barley, oats, and sugar-beet. Industries dependent upon agriculture include flour-milling, which is favoured by the dry climate, sugar-refining, and distilling. Hungary produces large quantities of flour and sugar annually.

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The leather trade is also considerable, but the shortage of trees creates a difficulty for the tanning industry, and two-thirds of the timber required for all industries is imported.

But the Magyar despises trade and industry, and most of the industries are conducted by peoples of other races, chiefly Germans and Jews. The bulk of this trade is with

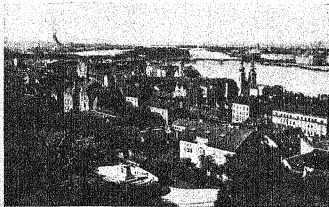


FIG. 107. BUDAPEST

By courtesy of the Hungarian Legation

Austria. It consists of flour and other cereal products, cattle, eggs and poultry, tinned fruit, and wine as exports, and textiles, machinery, paper, and glass as imports.

Coal of good quality is found north-west of Budapest. But although over 7,000,000 tons of coal are produced annually, coal is also imported from Germany and Czechoslovakia. Buda, the old city linked by a bridge across a river island to Pest, is the capital. The two towns hold about a million people. Well situated on high ground in a gap (the Hungarian Gate) between the Bakony Forest and the outliers of the Carpathians, it is the junction of the following routes: (1) *via* Jablunka Pass to Troppau;

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(2) Theiss valley to Lwów (Lemberg); (3) eastward to Klausenburg (Rumania); (4) south-east to Orsova (Iron Gates) *via* Szeged; (5) southward to Belgrade; and (6) south-west to Zágreb (Agram) and Fiume.

Raw materials for the manufactures therefore reach Hungary from all quarters—coal from the north, iron from the south, wheat for milling, sugar-beet, hides. Wine is also imported. The rivers are useful for navigation, except in flood-time, and most of the exports are shipped for transport on the Danube.

RUMANIA

Rumania consists of the highland region of Transylvania, surrounded by plains, which are themselves broken up into well-defined units—viz., Bessarabia, east of the river Prut, Moldavia, round the river Siretul, Wallachia, between the folded Transylvanian Alps and the river Danube, the Dobruja, between the Black Sea and the Danube south of the delta, and Banat, adjoining Hungary. The whole area is about twice the size of England and Wales.

Four-fifths of the population of 17,000,000 are agricultural, and live in scattered farms. Rumania is rich in natural resources, and prosperous. Its industrious peasants raise immense crops of maize, wheat, barley, oats, and rye. Hemp, flax, sugar-beet, tobacco, cotton, and the vine are also grown. Cattle, horses, and pigs are bred in large numbers, especially in Bukovina (in the north). In Transylvania and Bukovina are great forests yielding valuable timber, largely beech and oak, and in the foothills of the Carpathians are petroleum deposits which yield $2\frac{1}{2}$ per cent. of the world's supply. The oil obtained from the wells at Bacău has a high degree of purity. Moreover, Rumania ranks as one of the chief grain-exporting countries, and it is expected that production of both wheat and maize will considerably increase. In addition,

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Transylvania contains very fine salt, iron and copper ores, lignite, lead, and antimony. But the Rumanians do not take kindly to industrial pursuits. They are not town-dwellers, and manufacturing industries are only beginning in a few centres, like Braila, Galatz, and Constanta (Kustenje), all of which are primarily grain-exporting towns. But though evenly distributed over the land the people have an intense sense of nationality. The interests of Rumania are linked with those of Poland in their attitude toward Russia of preserving their prosperity against damaging political theories.

Most of the trade of Rumania goes down the Danube, through Braila and Galatz, in 600-ton barges to the sea; a small proportion goes up the river and into the Rhine and the Elbe. Similarly, two-thirds of the imports come up the Danube. But the Danube is frozen for weeks, and trade then travels by train between the port of Constanta, which is ice-free, Bucharest, and Orsova.

Bessarabia and Moldavia are a continuation of the rich steppe land of Russia. The peasants use the Russian tongue. The lower levels are covered with loess—that is, with a fine, wind-blown soil. Seven-tenths of the whole province is cultivated, and the higher country is forested. Villages occur mainly where rock underlying the loess comes near the surface. Moldavia produces one-quarter of the maize of Rumania. Stock-raising is growing in importance. Every village has a herdsman for sheep, for cows, and for swine. Every day these men summon their charges by sounding their horns. After the day's grazing on the common lands, the herds are brought safely home. Each animal knows its home, and when it reaches it quietly leaves the herd.

Wallachia is carved out into parallel strips by straight-flowing tributary streams of the Danube. The strips consist of (1) a broad tract, about eighty miles wide, of level, monotonous plain; (2) an upland region or plateau; and (3) the broad-topped mountain region. The Arges valley

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is particularly fertile. Maize thrives in the summer temperature of over 80° F., but there is a summer scarcity of water. Migration from the plain to higher levels with the advance of the dry, hot summer, is a feature of the pastoral peasant life.

Plöesci (Prahova) refines one-third of the oil production. The oil-wells are at Bacău, south-west of Jassy, and north-west of Bucharest. Giurgiu is the Danube oil port. Salt



FIG. 108. RUMANIAN WATER-MILLS ON THE LOWER DANUBE

Photo E.N.A.

is worked near Crajova. Bucharest, the capital (350,000), occupies the centre of the plain, and is the centre of railway traffic (*a*) to Constanta; (*b*) to Crajova and Orsova; (*c*) to Plöesci and the interior; (*d*) to Poland and Russia; and (*e*) to Ruschuk and Istanbul, or Constantinople.

The Dobruja forces the Danube northward to its delta. Much of it is limestone plateau, with marshes and lagoons between it and the sea. Wheat, on the higher ground, and livestock are the productions. Constanta is the only real port. But Sulina, on the delta, is the port for the Danube traffic, particularly grain. Sea and river fisheries meet at Tulcea.

Transylvania is an elevated basin, lying between folded mountains to the east and south, and the limestone hills

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of Bihar on the west. It is deeply cut by rivers. Communications go down one valley and up the next, rather than over the intervening ridge. Agriculture is the chief occupation. Though forests abound, lumbering is difficult because facilities for transport are poor.

The Danube is nearly 2000 miles long, and drains one-twelfth of Europe, but its traffic is only about one-fifth of that of the Rhine. This is because it flows away from the industrial countries, and the volume of water varies considerably. Winter frost also reduces its usefulness. Ulm (1400 feet above sea-level) is the head of navigation for boats of 100 tons, and Ratisbon is the limit for steamers. Passau, at the confluence of the Inn, is, however, the chief starting-place for steamers. Below Krems (west of Vienna) the river broadens out and is studded with islands. Below Budapest it meanders through the flood plain of Hungary. At Belgrade it is a mile wide, but narrows again at the Kazan gorge. At the Iron Gates the river flows over a cataract, through which a channel has been cut for navigation. But these obstacles still render navigation upstream difficult and slow. At Orsova (the headquarters of the Danube Commission) the depth of water available for boats decreases upstream to about 6 feet. At Ruschuk it is two and a half miles wide, and the only bridge below this is at Cernavoda. Below Braila the channel has been deepened from 9 feet to 24 feet, and the Sulina branch from 8 feet to 18½ feet, and the navigation shortened 11 miles by canalization. Vessels of 4000 tons can therefore reach Braila. The left bank in Rumania is low and marshy for a distance of twenty miles from the river in some parts. The towns lie along the old Roman road which followed the higher, drier, right bank. The navigation of the Danube is controlled by an International Commission, which guarantees equal opportunities for all nations.

CHAPTER XVII

RUSSIA

THE vast plain of Russia, extending over 1500 miles both from north to south and from east to west, contains two-thirds of the land area of Europe. It is composed of undisturbed sedimentary rocks, lying horizontally, and these have been eroded by ice in the north and by rivers farther south. Its soils have been transported and deposited partly by rivers and partly by winds. Historically and geographically, the Valdai Hills form the nucleus from which Russia has expanded. Yet they are only just over 1000 feet high. This gently rising area is continued southward, and forms the chief watershed. Between Leningrad and the Urals are other broken areas of high ground, known as the Height of Land. In the south the Volga Heights form another distinct area, and to the east the south-western hills of the Urals spread out into the plain. Upon this vast plain the four seas—White, Baltic, Black, and Caspian—have little climatic effect. Climatic conditions are uniform over wide areas; productions are similar; the long, slow-flowing rivers all suffer from winter ice and summer drought; railways can and do take short cuts. The rivers have been particularly important. The Volga, Europe's longest river (2325 miles), the Don (1150 miles), and the Dnieper (1330 miles) all flow southward, making sharp turns to east or west in their lower courses. One Dvina (625 miles) flows westward to the Baltic, and the other Dvina (1100 miles) northward to the Arctic. The basins of several rivers of Russia are so little separated that flood-waters easily pass from one to the other. Canals could easily be cut to link the whole system. There are over 100,000 miles of navigable rivers and canals. About

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a quarter of this distance is navigable for steamers and a half by rafts. The chief canals link Leningrad to the Volga and the river Dnieper to the Dniester and the Vistula. The Volga and the Don are linked by a railway,

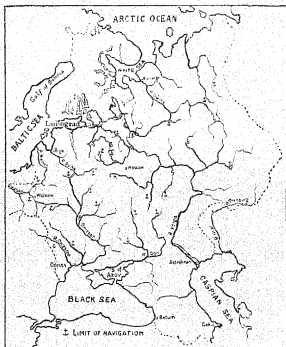


FIG. 109. RUSSIA: WATERWAYS

but a canal is also projected. Towns like Nijni Novgorod, at the Oka-Volga confluence, Tver, at the limit of navigation, and Moscow were early centres, from which traffic followed the Volga to the Caspian and Asia. From Pskov, on the western frontier, trade with the Baltic was carried on; from Smolensk and Kiev, the Dnieper led to the Black

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Sea, and so to Greek Christianity and the culture centred at Constantinople. Similarly, Asiatic invaders made their way up the rivers. But only by the river Neva, draining Lakes Ladoga and Onega, is Russia provided with a western outlet at Leningrad, and this is eight hundred miles from the North Sea. This northward and southward trend of the rivers, and the absence of natural boundaries, give Russia the characteristic of being neither wholly a

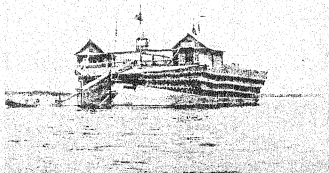


FIG. 110. BARGE ON THE VOLGA

Photo E.N.A.

European nor an Asiatic state, but of belonging to both continents.

The development of Russia, therefore, has suffered many hindrances. The flatness of the country in all directions has not helped in the formation of a strong united central civilization, for the peasant peoples have been constantly disturbed by attack from Asia. Moreover, widespread marshes and bad roads, due to the shortage of stone, render movement slow. River traffic is also slow. The railways therefore gain added importance. They were allowed to fall into a bad condition after the Revolution, but improvements are taking place in order to develop industry. Nature, while providing Russia with

RUSSIA

a rich soil, inflicts long and very severe winters, as well as frequent summer drought and consequent famine.

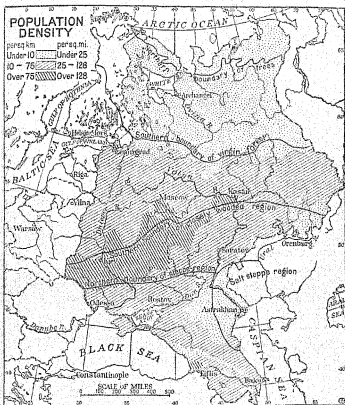


FIG. 111. RUSSIA: POPULATION DENSITY

From "The New World: Problems in Political Geography," by Isaiah Bowman (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

Such conditions discourage commercial and intellectual progress, for the entire energy of all, young and old, is needed for manual work. The leaders of the recent

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revolution, by trying to bring about similar movements in other countries the world over, have still further added to this isolation of the people of Russia. As most of the educated classes were killed or exiled, the process of recovery must continue to be slow. Forestry in the north, and agriculture in the centre and south, will remain the chief occupation, and manufactures will be merely subsidiary.

Reference has already been made to the chief belts of vegetation (see page 103). This natural vegetation is directly dependent on the climate. In April and October the isotherms have an east and west trend, showing that temperature decreases northward, and that the sea's moderating influence is not felt. In July, however, the isotherms run north-eastward, and in January south-eastward. So that while in summer any place lying east of another is hotter, in winter it is much colder, and the difference in both cases increases with the distance which separates them. The result of this is that the range of temperature is considerable everywhere, but greatest in the south-east—viz., south of a line drawn from Odessa to Orenburg. The duration of continuous frost is very important, for frost not only destroys many plants, but acts like a drought upon the remainder. A straight line joining the northern end of the Gulf of Bothnia to the south coast of the White Sea, and continued to the Urals, gives the southern boundary of the region which is frozen from six to eight months. Another, roughly parallel to it, from the Gulf of Finland encloses the region liable to five or six months' frost. A third, from the mouth of the Western Dvina to Kiev, and then to the Volga delta, marks the limit of four to five months' frost. And even in the south, around the Black and Caspian Seas, one to three months' frost may be expected, although this is half-way between the equator and the Pole.

As a result (1) only about a quarter of the area is fit for arable crops—practically one-half of the country is

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forested, one-fifth is unproductive, the remainder being pasture-land; and (2) no Russian river is free from ice in winter—Archangel harbour is frozen for nearly half the year, that at Leningrad for five months, Astrakhan suffers from frost for over three months, and Kherson for nearly three months.

In such open country winds play a great part. In winter the mass of cold air over Eurasia flows outward. The speed of the wind varies with the gradient between the continental high pressure and the North Atlantic low pressure. But fierce, ice-cold *burans* are common, and spread deep snow far and near. A foot of snow, however, yields only 1 inch of water on thawing. The winter 'rain-fall' of the three winter months at Moscow is only 3.5 inches. But the rainfall of the three summer months is 7.6 inches, over twice as much. Over most of the plain the prevailing wind is westerly or south-westerly in summer, when pressure over Eurasia is low, allowing cyclonic storms from the Atlantic to penetrate farther inland. The general tendency of air to rise over a heated land surface accounts for this summer rainfall. In the south, however, the general direction of the wind is north-east, and there is little rain, except in early summer. On the whole, the winds bring insufficient rain. Nowhere, even in the west, is it much over 20 inches, and in the north and east (south of the Urals) it is less than 10 inches, so that famine is common.

Both in the tundra and the forests hunting and fishing are the occupations, apart from the timber industries. The skins of bears, wolves, foxes, and sables are much sought after. It is difficult to conceive the vast extent of the forest. Stretching eastward into Asia for thousands of miles, and, even at its narrowest, as broad as Britain is long, it is estimated to contain one-third of the world's commercial timber. Most of the timber marketed travels by water. In this connexion note the canals linking the headwaters of the North Dvina to Lake Onega, and so to

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Leningrad, and the Pechora to the Volga *via* the Kama. The timber markets are Leningrad, Moscow, and Archangel.

Leningrad (1,614,000) is important as the only port for export to the Baltic countries. But the distance from the industrial areas is great. Manufactures of iron and steel and other metal goods are carried on to a less extent than formerly. Another industry is rope-making.



FIG. 112. LENINGRAD

Photo E.N.A.

Archangel exports the forest products, notably tar and pitch. It is a great market for furs. The extraction of oil from seals is an important industry. But its activities are concentrated chiefly into the summer months.

Of the cereal crops wheat now again exceeds rye, and, as formerly, is becoming the most important for export. The wheat and barley belt is in the south, especially in the Ukraine. The belt in which rye and oats are predominant runs north of the wheat belt in Central Russia. Potatoes are grown extensively in much the same area as rye.

Russia was formerly the greatest exporter of hemp, both the fibre and seed, and of flax. Hemp is grown round Tula and in the Kama basin; and flax in the centre and south. Sugar-beet is most widely cultivated in the west and south-west, tobacco in the south, especially in the valley of the

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river Kuban. Tobacco manufacture is carried on at Kiev, Kharkov, and Saratov. The vine does well in the Crimea and Kuban valley; fruit (apples, pears, and stone fruits) in the Volga region.

The north and extreme south-east are the chief pastoral areas. Russia is next in importance to Australia and Argentina for the production of wool, and to India and the United States for cattle. But both wool and leather are now imported. Sheepskins are widely used for winter clothes, and hides supply the raw material for Russia's important leather trade. Horses are of great importance, and they probably number one-third of the world's supply; pigs and goats are kept in large numbers. Dairying is growing in importance in Central Russia, and the production of butter is increasing.

Ukraine and the region east of it to the Volga Mountains is covered with deep, rich loess soil—the famous 'black earth.' The rainfall of this region is, however, uncertain, never much more than 20 inches, and often less in the west, and always growing less the farther east one goes; extremes of temperature are great (over 50° F.). Having both fertile agricultural land and coal, the population is large and important. As already indicated, wheat and maize for export, rye, oats, and potatoes for home markets, and sugar-beet are the chief crops. About one-eighth of the area, chiefly in the south, is either pasture or under fodder crops, clover and alfalfa.

Kiev (513,000) is the capital of the Ukraine, and at one time was the capital of Russia. It is protected by the swamps in the north, and controls the route to Berlin south of them. It is a city of churches, a great market town, with factories for milling, sugar-refining, and tobacco.

Kharkov (417,000) is the mining and metallurgical centre of the Donetz basin.

Odessa (421,000), much reduced in the number of its houses and in population, owing to the Revolution, is the

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chief port, and exports the cereals grown in the Dniester and the Dnieper valleys. Oil is imported from Batum, together with manufactured goods and tropical foodstuffs.

Oil is found in the Caucasus and in the lands to the east of the Caspian, at Grosny and Baku. The Baku district (453,000), at the south-east end of the Caucasus, is one of the richest oil areas in the world. The oil is piped to Batum for export, or sent in tank steamers to Astrakhan for distribution by barge up the rivers for home use. Coal occurs chiefly in the Donetz basin (south-east Ukraine) and in the Oka basin, round Tula; some in the Urals and Caucasus. Extensive peat deposits occur in the centre and north. Iron is plentiful in each area. From the Caucasus nearly one-half of the world's supply of manganese is exported from Poti, to the north of Batum. At Perm and other places in the Urals precious metals, platinum, gold, and silver are found, as well as copper, tin, lead, and zinc. Deep salt-beds occur in the South Urals, and asbestos at Sverdlovsk, or Ekaterinburg. Salt is an important commodity in Russia, where the winter months necessitate preserved foods—largely fish and meat.

The industrial area which utilizes these mineral products lies between Moscow and Tula.

Moscow, the metropolis, is "the largest village in the world," for although its population numbers over 2,000,000, and is growing, it is of all the cities the most Russian. Its weather-beaten city wall, and the Kremlin area in the centre, with its cathedrals, palaces, museums, and battlemented monasteries, indicate its age. Modern developments, electric light, tramcars, theatres, and shops serve only to enhance its age. Fires have devastated it, but it remains the heart of Russia. To-day oil and the Primus stove play an important part in the lives of the crowded population. The country around is a clearing of the forest and therefore not very fertile. Wolves still haunt the outskirts of the city and do considerable damage.

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But its central position makes it an ideal market. Railways focus upon Moscow from all directions. It is better served by railways than by rivers and roads, eight-tenths of its traffic being over the first and only one-tenth each over the latter. Spinning and weaving of wool and cotton and the making of linen are the most important industries. Hides and skins from the steppes feed its leather trade.

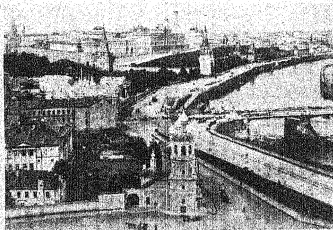


FIG. 113. MOSCOW, SHOWING THE PALACE WITHIN THE KREMLIN
Photo E.N.A.

Tula (153,000) is the centre of the hardware manufacture and of munitions. To the east of Moscow, on the Volga, stand Nijni Novgorod (185,000) and Kazan (179,000), near the Kama valley, both market centres for furs, animals, leather, silk, and China tea. Both have diminished in importance. At one time Nijni Novgorod attracted merchants, from Europe in the west, and from China in the east, to its annual autumn fair, and goods to the value of many millions changed hands.

To the south, on a great bend of the Volga, stands

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Samara (176,000), a comparatively new market town for the grain now grown on parts of the steppes. Saratov (215,000) is a military centre, and Voronezh (120,000), on the Don, is another grain centre.

Constitution and Government. In March 1917 a revolution broke out which ended the rule of the Tsar. Most of the former empire is now ruled by the Soviet Government, but Finland, Poland, Estonia, Latvia, and Lithuania, as we have seen, are independent states. Certain other areas have formed independent republics, with a Soviet form of Government—*e.g.*, Ukraine—but are federated to the main body, which is called the Russian Socialist Federal Soviet Republic (R.S.F.S.R.). The State owns all land, factories, railways, and means of production and transport, but may lease them to individuals or corporations. For further reference to Transcaucasia and the Republics of Armenia, Georgia, and Azerbaijan, see pages 686-687.

CHAPTER XVIII

THE THREE SOUTHERN PENINSULAS

COMPARATIVE FEATURES

Structure. In each of these peninsulas there are areas of Archaean rocks and ancient stratified rocks, like the 'massifs' of Scotland, France, and Bohemia. In the Iberian peninsula there is the block covering two-thirds of the whole area, called the Meseta. In Italy, Corsica, and Sardinia, parts of Sicily, and the 'toe' of Italy, are also portions of old, hard plateau. In the Balkan peninsula these ancient blocks occupy the heart of the country, and lie chiefly north of the Aegean Sea.

Against these resistant blocks younger rocks have been thrust on, folded, and faulted. In Spain the Cantabrian Mountains, the Pyrenees, and the Sierra Nevada are Tertiary foldings, in which newer rocks than those of the 'core' are generally in evidence. The Alps and Apennines, most of Sicily, the Balkans, the Dinaric Alps, and the Pindus Mountains are the folded mountains of the other two peninsulas.

There are, however, considerable areas of newer and softer rocks. In several cases alluvial deposits lie on the older rocks, and cause fertile areas. The chief of these are the upper basins of the rivers Douro, Tagus, and Guadalquivir, and the Ebro basin in the Iberian peninsula; the plain of Lombardy in Italy; and the Maritza basin in the Balkan peninsula.

The shape of the coasts is also traceable to faulting. Both the rectangular shape of the Iberian peninsula and the great arcs on the south-east coast mark fractures. The Gulf of Taranto, the coast of Calabria, Sicily, and the Bay of Naples are examples in Italy. The rocky cliffs and

THE COUNTRIES OF THE WORLD

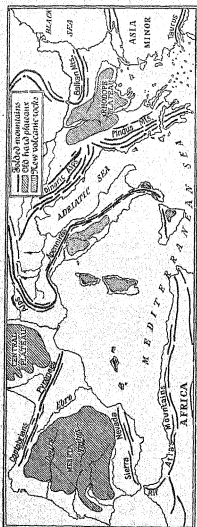


FIG. 114. COMPARATIVE STRUCTURE OF THE THREE SOUTHERN PENINSULAS

deep bays of the town for
ern coast of. Saratov
are mostly 10,000), on
faulting. Also
lines of weakly a revo-
canic activity. Most
taken place, it Govern-
larly in Italy and Lithu-
Vesuvius, Etna and other
Stromboli are a Soviet
active. Patchfederated
fairly recent volcanic
rock occur in the
Rhodope Mountain and
and elsewhere in the
Balkans, Asia and the

Mediterranean see pages
mate. The climate
experienced by
peninsulas is
distinct in type
similar to that of
in California and
the three south
continents at so
west Africa, south
and south-west
Australia and Cer
Chile, so that
name 'Mediterr-
ean' is applied to
climate of them.
The most charac-
teristic feature is the
long, dry, sunny sum-
mer. High-pressure
extends over the

THE THREE SOUTHERN PENINSULAS

Western Mediterranean in summer and the chief winds are northerly, often strong by day but less strong at night. Clear sky leads to high day temperatures. Thunderstorms, however, frequently occur. During the winter, this high-pressure belt having moved southward, the Mediterranean is chiefly under a trough of low atmospheric pressure lying between the two high-pressure areas over the Continent and over the Sahara. The winds are mainly westerly and south-westerly, and are often rain-bearing.

But the three peninsulas cause three tongues of higher pressure to extend southward, which modify the direction and force of the winds, the temperature, and

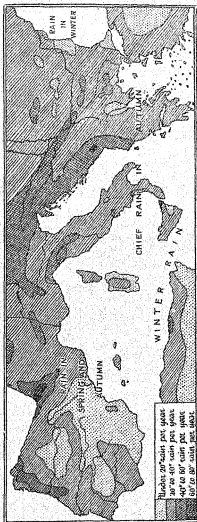


FIG. 115. THE THREE SOUTHERN PENINSULAS: MEAN ANNUAL RAINFALL

Based upon the map illustrating Mediterranean rainfall by W. W. Jarvis, M.Sc., published in the *Geography Teacher*, summer 1965.

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the rainfall. On the whole, their west coasts are warm and moist, but their east coasts frequently have northerly winds, and are drier and colder. The interiors, particularly where there is broad, high land, as in Spain and the Balkans, are the driest and coldest parts. In general, only half as much rain falls on the east as on the west coasts—for example, Lisbon, 29 inches; Murcia, 15 inches.

The cold winds have local names—for example, the *mistral*, experienced between the Ebro and Genoa, especially strong in the Rhône valley; the *bora*, along the Dalmatian coast. These winds, and similar cold winds on the northern Ægean coast, are all due to cold air pouring down to areas of low pressure from the high mountains in the north.

At times, however, especially in spring as the sun moves northward, these winds are replaced by hot, dry winds from the south. The *sirocco* in southern Italy and Greece, and the *leveche* in south-east Spain are dust-laden, suffocating to man, and drought-bringing to plants.

On the whole, the winter rains are less in amount than in North Europe, and the rain falls in heavy showers of shorter duration and on fewer days. Along the North African coast November and December are the wettest months. The dry season is most pronounced, and lasts for six months. It, however, shortens northward to four months in Sicily, three at Naples, two at Rome, and one month at Genoa. So that the greater part of these three peninsulas receives a small amount of rain even during the summer months. But the bulk of it falls in the winter half of the year, with two particularly wet periods in autumn and spring.

On the Meseta of Spain, and in the plain of the Po, these Mediterranean characteristics are cancelled by continental conditions. As a consequence, in both these regions more rain often falls in summer than in the winter months.

The north and north-west coasts of the Iberian peninsula have a climate like that of western Europe. Only the

THE THREE SOUTHERN PENINSULAS

south-east coasts have a Mediterranean climate, for the Meseta is like a little continent with extremes of temperature, scanty rainfall, considerable radiation, and consequent dust, all producing barrenness. In Italy only the south, and, to a lesser extent, the sheltered Riviera coast, has typical Mediterranean climate. The height of the Apennines and the Tuscany highlands, and the overshadowing effect of the Alps in the Po basin, greatly modify the climate of Northern Italy. The easterly position of the Balkan peninsula brings it more under the influence of the land mass of Eurasia. The western coast and the south, however, get Mediterranean climate.

Vegetation. These distinctive features of climate produce equally distinctive features of vegetation. To survive the dry season, plants develop devices to reduce transpiration (the loss of moisture through leaves and stems). Trees and shrubs do not grow tall, and so escape some of the drying action of wind. Leaves are fewer, smaller, thicker, and often protected by resins, wax, oils, or hairs, or reduced to thorns or prickles. Stems are protected by much cork, as the cork-oak. The vine and other plants send down long roots to tap the deep reserves of moisture. Others store water underground in bulbs, tubers, and root-stocks—for example, narcissus, tulip, onion, and garlic.

The natural vegetation consists of forests and shrublands, but they are not dense and luxuriant. The cork-oak, the umbrella-shaped stone pine, the cypress, cedar and olive form the most common woods, but in moister surroundings ash, plane, and other deciduous trees are common. Everywhere in these peninsulas forests have been carelessly thinned out. In clearings, shrubs like the laurel, myrtle, oleander, rosemary, and smaller trees like the fig, carob (locust bean), and dwarf palms establish themselves. This Mediterranean vegetation is found on the lower mountain slopes up to about 2500 feet. In order of ascent the evergreen oak, deciduous oak, beech,

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coniferous species, and grassland merge gradually from one predominant type to another.

Cultivated crops are very varied: wheat, maize, and rice; grape, olive, orange, lemon, almond, and fig; walnut and chestnut; cotton and tobacco. The prolonged dry, hot season does not suit grass, so that there is not much good pasture. Sheep and goats are more plentiful than cattle, asses and mules more numerous than horses.

The most important aspect of these peninsulas, however, is the culture which they have given to the world. The Greeks produced some of the finest examples of architecture, sculpture, drama, and poetry, the influence of which will never die. We owe to them not only the development of the art of writing, but the beginnings of medical science, mathematics, astronomy, political science, philosophy, and history.

Italy likewise is immeasurably rich in treasures of all kinds and of all ages alike in art, architecture, and literature.

Spain preserves abundant evidence of the culture of the Moors and of her own great achievements in exploration. The Moors (Arabs) had learned to get great results from poor land, and they used their knowledge of agriculture and industry to transform the face of Spain. They built reservoirs, they transported soil, they introduced new plants, they terraced the mountain slopes to plant vineyards, and they built palaces. The prefix *guad* to the names of Spanish rivers is the Arabic *wadi* (river).



CHAPTER XIX THE IBERIAN PENINSULA

SPAIN

THE general slope of the plateau (or Meseta) is, as the rivers indicate, to the westward. The Meseta occupies two-thirds of the Iberian peninsula. The valley of the Ebro, which flows to the south-east, is the only important exception. The

average elevation of the Meseta is between 2000 feet and 3000 feet, but the Sierras—'saw-like' because the passes are little lower than the main ridges (da Estrella, de Gata, de Grados, de Guadarrama)—rise to 4000 feet or 5000 feet. In the basins where alluvial soils cover the old, hard core, rivers have cut deep gorges. This



FIG. 126. SPAIN: IRRIGATED AREAS

From "The New World: Problems in Political Geography,"
by Isaiah Bowman (The World Book Company, Teachers of
Hudson, and George G. Harrap & Co., Ltd., London)

type of valley is characteristic of an arid climate, for erosion is done mostly by the river itself. Its banks are not gently graded as in rainy countries with countless tributary streams. The rivers vary in volume, and have many rapids. Excepting the Guadalquivir, they are useless for navigation and hinder rather than help communication. Lack of rainfall and extremes of temperature

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account for the sparse population. Madrid, the capital, with a population of nearly a million, and Valladolid (80,000) are the only large towns of the high Meseta. The importance of Madrid is due to its central position. The country around is not fertile; its climate is unpleasant, summer days with the temperature often over 100° F., but cold at night, and in winter snow and frost. But it is the

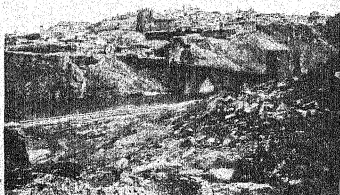


FIG. 117. TOLEDO: THE PUENTE DE SAN MARTIN

Photo E.N.A.

railway centre, and thus has been able to develop considerable manufactures, especially leather and tobacco. The chief routes from Madrid are:

- (1) To Lisbon *via* Toledo (famous as the medieval capital and for its swords) and Talavera, avoiding the Tagus gorge.
- (2) Southward *via* Alcazar, avoiding the steep escarpment of the Sierra Morena to reach the Guadalquivir, which it follows to Seville and Cadiz.
- (3) *Via* Alcazar and Albacete to Valencia, to Alicante and,

THE IBERIAN PENINSULA

following the winding valley of the Segura, to Cartagena.

- (4) Northward *via* Valladolid to (a) Oviedo and Gijon, using the Pajares Pass, (b) Santander through the Col de Reinos, and (c) San Sebastian and France *via* Vitoria and the Pancorbo gorge.
- (5) Eastward to Zaragoza (Saragossa), by the Jalon valley, and then by the Ebro valley to the coast, Barcelona, and France.

Valladolid is the centre for the upper and more fertile Douro basin, in which high-grade wheat is grown. Wine is produced in the valley, and merino sheep and mules graze on the drier, higher levels. Esparto grass is the natural crop. It is exported for paper-making. Three-quarters of the population of the whole peninsula live on the margins between the plateau and the coasts. All the chief towns occupy central positions in basins, or river valleys, or are ports.

In the northern mountainous areas of Galicia and Asturias the Carboniferous rocks are rich in minerals. Coal is mined at Gijon, iron to the west of it, and mercury, manganese, zinc, and copper are found. To the west the mountains terminate abruptly, and the valleys become drowned, forming typical rias with good harbours at Ferrol, Corunna, and Vigo, but not important ports. Farther east red hæmatite ore, zinc, and lead abound. Lignite supplies blast-furnaces at Bilbao and Santander, but most of the ore is exported to Britain (South Wales). The Basques of this province are a different race from the other Spanish peoples, and more vigorous and alert.

The Pyrenees average 6000 feet, with the highest point 11,000 feet, and have few and difficult passes—viz., Col de Perche, de Somport, and de Perthus. Note how the chief routes pass east and west of these ranges. Richly forested, with fruit and green meadows in the lower valleys, life is typically alpine. The Pyrenees form a great barrier, and economically are of little importance. High up in

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the mountains is the small independent republic of Andorra, a mere cluster of villages, approached only by mule-track.

The Ebro basin is shut in from the sea by the mountains of Catalonia, through which the river cuts its way to its delta. Wheat and other typical crops are grown, and small quantities of coal, iron, and salt are found. Zaragoza



FIG. 118. SPANISH HOUSES IN A VALLEY

By courtesy of E. M. Rick

(157,000) is the route centre, and a market for olive oil and wine, with foodstuff factories, milling, sugar-refining, and iron and steel works.

Catalonia is the industrial province, with Barcelona (775,000) as the commercial capital. Here landed the Carthaginians (hence Catalonia) in the third century. The empire they founded was later succeeded by that of the Goths and the Franks. It is about 150 miles from the French frontier. With supplies of forest and mineral products from the interior, and coal and raw materials by sea, with water-power from the Llobregat river, and

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an excellent artificial harbour, its population can engage in varied manufactures—cotton, woollen, and silk goods, iron and steel, shipbuilding, leather, and furniture. In addition the port exports the wine, fruit, and nuts of the fertile river valley. Tarragona, about sixty miles to the west, is the port for the rich wine and fruit regions behind it. Olives and almonds are important products. Tanning and silk- and lace-making are other trades in this district.

Valencia and Murcia both have a rich coastal plain covered with alluvium brought down from the fold mountains behind them. The wealth of these districts is agricultural. Here Roman and Moorish irrigation canals are still used to take water to the fruit-gardens. All the Mediterranean fruits, cereals, and the mulberry do well. The rich red alluvium yields sometimes two or three crops a year. Even sugar-cane, rice, and dates are grown, and population is dense. Valencia (270,000) is the third town of Spain, has silk manufactures, and weaves esparto grass into fabrics. Raisins from Denia are important among fruit exports. Valencia has a good trade with the Balearic Islands.

Alicante (69,000), 100 miles farther south, has Elche near it, with some 80,000 date-palms. Alicante is therefore another fruit port, with silk, tobacco, and grass-weaving industries. Cartagena (97,000) has a fine natural harbour and is a naval station. Besides fruit, there are ores of iron, copper, silver, and lead; also there are sulphur and saltpetre deposits in the near-by Sierras. Aguilas and Almeria are ports for iron ore and fruits. Malaga (160,000), the fifth town in Spain, is the capital of its rich province, exporting particularly olive oil. It has important industries in cotton and silk, metal, pottery, and sugar, together with sponge and tunny fisheries.

The basin of Andalusia, some 350 miles long, is open to the westerly winds. Wheat, maize, oranges, and olives are the chief crops, but the vine and other fruits abound. Great quantities of olive oil of fine quality are produced

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here. It is also the next largest mineral area after Cantabria. Iron in large quantities, copper from Rio Tinto, coal from Cordoba and Seville, and other minerals from the Sierra Morena are exported from Huelva (45,000).

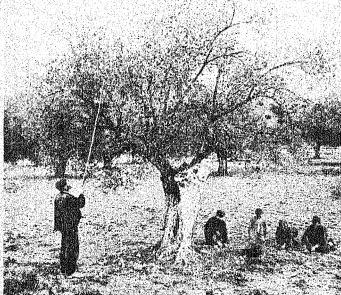


FIG. 119. OLIVE-TREES

Photo E.N.A.

Cordoba (83,000) is one of the old Moorish towns, and Seville (218,000) is the focus for the wealth of the area, agricultural and mineral. Wool and silk, olive oil, leather, and pottery are the basis of its industry, which is aided by the tidal river. The growth of Seville as a port has brought about the decline of Cadiz (79,000), with its fine natural harbour, once, when its treasure fleets were raided by Drake and other British buccancers, the wealthiest

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port of Western Europe. Jerez (67,000) is a wine centre (sherry). Granada (109,000), in the heart of the mountains, near Sierra Nevada, is the most famous Moorish city, noted for the palace of the Alhambra. Rich crops of wheat, sugar-cane, and sugar-beet are grown round it.

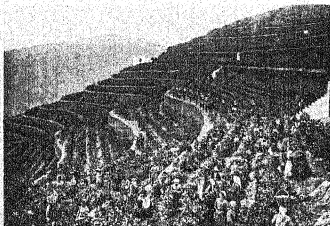


FIG. 120. A TERRACED VINEYARD IN THE DOURO PROVINCE

Photo E.N. 4.

PORTUGAL

The northern portion of this rectangular country is mountainous; the southern part is chiefly plain, except for the mountains of Algarve, ending in bold Cape St Vincent. Enjoying a splendid climate, a large proportion of the country is fertile without irrigation. But only about half is tilled, and methods of cultivation are backward, and although wheat and maize are grown, it is necessary to import 500,000 tons of these cereals as well as rice to supply the demand.

Oporto (216,000), in the north, is the great port-wine market, and has a fine natural harbour. The steep cliffs

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of the Douro gorge are terraced for a distance of thirty miles. Olives and wine are the typical products of Por-



FIG. 121. CORK-OAKS

From Jordan and Calver's "High Lights of Geography: Europe" (copyright 1925 by the World Book Company, Publishers, Yonkers-on-Hudson, New York)

tugal. Cork-oak to the value of a million pounds a year is exported from its forests. The mountains, as in Spain, are rich in minerals, but these, except for iron and copper, are little worked. Portugal has great reserves of water-
320



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power, and the north the flow of the rivers over their waterfalls varies considerably. Textiles constitute the chief manufacturing industry, but at present these woollen, cotton, and linen manufactures are still carried on on a small scale, chiefly near Coimbra (21,000) and the Sierra da Estrela, at Oporto, and at Lisbon.

Lisbon (500,000), the capital and chief port, has fine land-locked harbours, but it has suffered from earthquakes. Coal, wheat, rice, cotton, and fertilizers are imported, and fruit, cork, oak, tinned sardines, and olive oil are exported. Considerable quantities of cacao from São Thomé arrive for re-export. Britain takes half of Portugal's productions of wine, and most of the almonds and fruits.

Fisheries play an important part in the life of the Portuguese, fishing, indeed, being the second chief industry. Fish are used both for food and as fertilizers, and much is exported. The sardine industry centres at Setubal, a few miles south of Lisbon. Tunny are also caught in large quantities. Pigs in large numbers are fed in Estremadura.

GIBRALTAR

Gibraltar (British) is a small rock peninsula, joined to Spain by a low isthmus, which is neutral territory. The Rock has a steep eastern face, and the town, with its harbour and coaling station, is on the western slopes.

THE BALEARIC ISLANDS

The Balearic Islands, Majorca, Minorca, and others (once British), belong to Spain. They are hilly, but fairly fertile with the help of irrigation. Palma is the capital. Oranges grow on the rainy side. Fisheries are important.

CHAPTER XX

ITALY

IN addition to the peninsula itself, the Kingdom of Italy includes the islands of Sicily, Sardinia, and Elba. The part of Italy that is enclosed between the great curve of the Alps and the Apennines—viz., the basin of the Po—has many characteristics of continental Europe, which are quite distinct from those of peninsular Italy. Northern Italy contains the largest area of Italian lowland. In the peninsula there is but little lowland. It is important to remember, too, that in this plain the climate is quite continental. In winter it is subject to very cold winds, and the temperature is often lower than in England; while in summer it is often hotter than in the south of the peninsula.

The peninsular part of Italy, with its 4000 miles of coast, its central position, and its Mediterranean climate, has been of great importance throughout history. The Apennines, composed largely of sandstone and some limestone, curve throughout the whole length of the peninsula, and form a barrier between the east and west plains, particularly in the north. From the middle to the south, they are broken into flat-topped blocks. Earthquakes are a common occurrence in this faulted area. The young soft rocks weather rapidly, and rivers erode their valleys deeply, spreading out the waste on the marshy alluvial plains. Rising on an average to some 5000 feet, their climate is distinct from that of the plains. In the central part snow lies deep throughout the winter, temperature changes rapidly between the coast and interior, and rain falls on higher ground in summer. To the south, in the Calabrian peninsula, the mountains have areas of granite and gneiss.

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In the north, where the mountains crowd the coast, passes are naturally important, but even so railways have

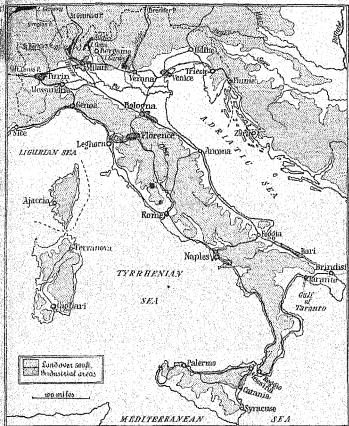


FIG. 122. ITALY: RELIEF, INDUSTRIAL AREAS, AND RAILWAYS

to tunnel through them. Note the Bochetta and Altare Passes. To the south, river valleys provide routes across the mountain barrier, and several railways use them; for

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example, from Rome to the east coast the railway uses the Tiber-Pescara valleys, another line connects Naples with the east coast, and a third route leads across from Florence.

The Apennines were once forested, largely with chestnut, but the herdsmen of the sheep and goats have, through the centuries, destroyed large portions, so that most of it is now either pasture or quite barren. This has increased the flooding effects of rain, and results in malarial marshes in lowlands.

As in Spain, the population crowds along the coast, where there are between 300 and 400 people per square mile. About one-quarter are engaged in agriculture, but the development of electric power is adding to the industrial population.

The most populated areas in the peninsula are in the Arno basin, around Naples, along the northern part of the east coast, and along the south-east coast round Bari.

The Western Plain. The Italian Riviera, or Liguria, is famous for its picturesque scenery and its genial climate. Between Spezia and Mentone beautiful coves and valleys, separated by bold promontories, attract visitors. Wherever possible, land is terraced for fruit or laid out as gardens; but limited cultivation compelled the people to be seafaring. Savona (65,000) imports coal and iron for its steel industry. But Genoa is by far the most important port.

Genoa (625,000) stands in the centre of this coast at its most northerly point. It has a good harbour, with fairly easy passes to the Po basin. In the Middle Ages it was world-famous as the market for all the treasures of the East. The Suez Canal and the Alpine tunnels have helped to restore its prosperity. Switzerland no less than Italy regards it as its chief port. Here are the headquarters of the Italian shipping companies. Like Liverpool, it imports cotton and grain, but also coal and iron for shipbuilding. Its exports—smaller in amount—are chiefly textiles, wine,

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and motor-cars. Other products of the coast, chiefly foodstuffs, go by rail.

Spezia (110,000) is the chief naval dockyard. At Carrara, near by, are the famous quarries of marble and serpentine, covering nearly 100 square miles.

The province of Tuscany is one of the most important districts of Italy. The valley of the Arno, which flows through it, is one of the most fertile parts, sheltered and



FIG. 123. GENOA

By courtesy of the Italian Travel Bureau

well watered, producing excellent wheat, olive oil, and wine. The mulberry-tree flourishes, so silk and fruits are exported, and straw-plaiting is its special industry. Florence (318,000), the capital of the province, is one of the greatest art treasuries of the world. The Florentines have always been famous as sculptors, painters, architects, and poets. Secure amid the hills and marshes, and at the point where the Rome-Bologna route crosses the Arno, great wealth has flowed to it, and its big revenues gave rise to banking. Pisa was the port in Roman times. Siena too has a splendid cathedral and art treasures, and is a

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university town, but also manufactures pottery and tiles, and makes straw-plait and silk articles.

The plain of Latium, stretching away to the south, is almost uninhabited. This is due to the marshes, which provide a breeding-ground for the malarial mosquito. Woods of oak and chestnut grow on the hills, and the ter-

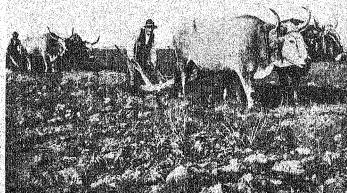


FIG. 124. PEASANTS OF THE CAMPAGNA PLOUGHING

Photo E.N.A.

aced lower slopes are cultivated with wheat, tobacco, and fruit.

Rome (nearly 1,000,000), built on its seven low hills, with the Tiber and its flood-plains for markets and public assemblies, was once the capital of the world. It is still an important route centre, and still a city of world-importance, as the home of the King, Government, and the Papal State of the Vatican. The ruins of Roman times, notably the Forum and Colosseum, the palace of the Vatican, and St Peter's Cathedral and other churches have unique interest. The Tiber is no longer navigable, but

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railways and roads diverge (*a*) to Genoa along the coast ; (*b*) *via* the Tiber-Arno valleys to Florence, and on by the Reno valley to Bologna ; (*c*) *via* the Tiber-Pescara valley to the east coast ; and (*d*) by the old Appian Way to Naples.

Naples (1,000,000) is now larger than Rome. The plain

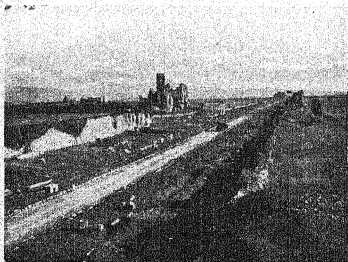


FIG. 145. THE APPIAN WAY

Photo E.N.A.

of the Campagna, of which it is the centre, is rich with volcanic soil from Vesuvius. For although volcanoes are often destructive of human life and property, they are constructive in that they form new rocks, which weather into rich soils. All Mediterranean fruits flourish, and Naples, having a magnificent harbour, is the focus of trade. Sulphur, silk, and hemp are special exports, cotton, coal, and iron being imported. This enables factories to prepare foodstuffs ; for example, sugar, macaroni, vermicelli, and

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also textiles and motor-cars. Tourists are attracted by its beautiful bay, by the ruins of Pompeii and the volcano. Railways radiate to Rome, across the mountains to Foggia, and *via* Potenza to Taranto and Brindisi.

Calabria, to the south, has forests of beech and fir on



FIG. 126. THE BEAUTIFUL BAY OF NAPLES

Photo Altinari. By courtesy of the Italian State Railways

the granite mountains. The lowlands are marshy but well peopled, and produce cotton, tobacco, and the usual fruits.

The mountainous island of Sicily is densely populated owing to the rich volcanic soil, but the population is far from being wealthy. Palermo (456,000), on the north coast, and Catania (283,000), under the shadow of Mount Etna, are the largest towns. But malaria, earthquakes,

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volcanic eruptions, and famine keep the people poor in spite of rich crops—particularly of lemons, other fruits, and wheat—and the trade in sulphur. Fishing occupies many of the people. Sardinia is a block mountain of granite, thinly populated by farmers and fishermen. Cagliari (94,000), in the south of the island, is the capital and port. But the island is too isolated and too rugged for favourable conditions of development. The Sardinians themselves speak several diverse dialects, are much divided, and suffer much from malaria.

The **Eastern Plain** has a poor coast. The small towns are fishing and market towns with a trade in agricultural produce—hides, wool, and gut. Ancona (83,000) is the chief port. Bari (175,000) is the chief port for north Apulia, and Brindisi (41,000) is the railway terminus and used to be the passenger port of the overland mail route to Egypt and the East. For hundreds of miles cultivation is carried on with a plan of monotonous regularity, lowland fields growing vines, olives, mulberries, hemp, and flax, with pasture on the higher ground for cattle and sheep.

Northern Italy. This consists of the Alpine lands and the plains of Lombardy and Venetia. The steep slopes of the Alps are cut by gorges and valleys which converge upon the plain. Towns guard the exits to the plain. Piedmont, in the west, is a region of forested mountain slopes and cultivated terraces on the lower slopes. The most important route centre is Turin. Routes lead *via* (a) the Dora Riparia to Susa and the Mont Cenis Pass (6800 feet) to the Isère valley; (b) the Dora Baltea to Aosta and the Great St Bernard Pass (8100 feet) to the Rhône and Little St Bernard (7100 feet) for the Isère valley.

On the north of the plain the Swiss frontier descends to the neighbourhood of Lakes Maggiore and Como. Milan is the meeting-place of routes from (a) the Rhône valley (at Brig) *via* the Simplon Pass (6600 feet) and Lake Maggiore; (b) the Rhine and Reuss valleys *via* the St Gotthard

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Pass (7000 feet) and the Ticino valley; and (c) the valleys of the Danube and the Inn *via* the Maloja Pass (6000 feet) or the Stelvio Pass (9000 feet) to the Adda valley. Farther east lies the new Italian territory of the Trentino, with routes *via* the river Adige, the Brenner Pass (4500 feet),

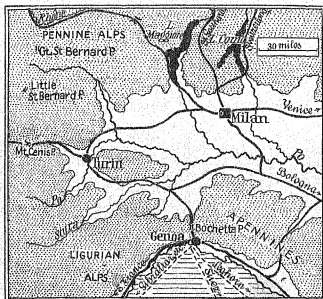


FIG. 127. POSITIONS OF MILAN, TURIN, AND GENOA

to the Inn and the Danube. The Italian Lakes Maggiore, Como, and Garda, with beautiful scenery and a sunny climate, are tourist and residential districts. As in Switzerland, water-power from the descending rivers is used for electricity, which is transmitted in great cables to the towns of the plain.

The Po basin covers 30,000 square miles. The Po itself rises near Mount Viso and flows due east, but is deflected

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to the south as each powerful tributary from the Alps joins it. The immense amount of material carried by these swift rivers is deposited as the speed slackens, so that the river builds up its bed toward the delta. This process has been going on during the course of many centuries, and it has been necessary to build embankments for hundreds of miles to protect the adjoining plain from floods. This, however, facilitates irrigation, and the basin has the most varied crops of southern Europe—not only wheat, maize, and vines, but rice and some cotton. This variety of crops is due to the range of temperature experienced, and to the other special climatic conditions. Observe that olives, oranges, and lemons are not mentioned, though these can be grown in a few favoured spots. In addition, the cattle and sheep grazed on the rich pasture-land in the south yield butter and cheese (Gorgonzola and Parmesan) for food, and wool and hides for industry. Around the north of the plain, the mulberry, watered by irrigation, provides food for silkworms, which flourish in the dry atmosphere. Labour is abundant at low cost. The way in which vines are trained to the mulberry-trees, while wheat, maize, and rice are grown on the intervening spaces, is a striking instance of intensive cultivation. In production of raw silk Italy comes third after China and Japan.

The winter cold of the plain creates a demand for wool. Sheep on the mountain pastures were the original supply, which is now supplemented by imports from Argentina. The skill acquired in handling wool has been applied to cotton and silk, hemp and jute. Italy now employs as many workers as Britain in the cotton industry, and cotton goods form one-seventh of the total of Italy's exports. These large textile industries necessitate the manufacture of machinery. As Italy lacks both coal and iron, both commodities are imported, and engineering is established at big centres like Milan (973,000) and Turin (597,000). Milan surpasses Lyons in importance as a silk centre.

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Like many others of the towns in this plain, it stands clear of the rivers in the centre of a plain, and at the junction of north-south and east-west routes. Turin to-day is the next largest town to Naples, Milan, and Rome, with industries similar to those of Milan.

Venice (260,000) is the most historic town of the plain, and is still a port and naval station. It has also important

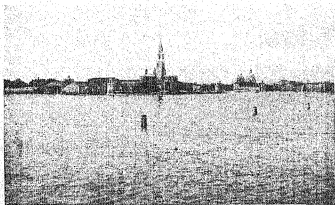


FIG. 128. VENICE

By courtesy of the Italian Travel Bureau

interests in textile, shipbuilding, and fishing industries. But of chief importance is the artistic skill of the people in mosaic, glass-making (from local sand), lace, and all kinds of beautiful handicrafts. Its unique character, history, and art leads to a great influx of tourists.

The towns Peschiera, Verona, Mantua, and Legnago form a quadrilateral of military and commercial importance.

On the south of the plain note the straight route from Piacenza, on the Po, through Parma, Bologna, and Ancona, running at a distance far enough from the Apennines to escape the lateral spurs.

CHAPTER XXI

THE BALKAN PENINSULA

YUGOSLAVIA

YUGOSLAVIA occupies the southern portion of the plain of Hungary and the central and north-west mountain regions of the peninsula. In area slightly less than the British Isles, its population is about a quarter of our own. Forests of oak, beech, ash, elm, maple, and lime, with pines and firs on the higher slopes, cover a third of the country, and account for nearly a quarter of its export trade. The forested districts are Bosnia, Herzegovina, and Serbia. Pastoral industries come next to the forest industries in value. Between two and seven millions each of pigs, sheep, cattle, and goats are kept. But crops of maize, wheat, oats, barley, and rye are all grown, in the order of importance mentioned, to a sufficient extent to give rise to the chief manufacture—that of flour-milling. The maize also favours extensive poultry-keeping. The grain itself is also exported. Fruit, particularly plums, apples, and pears, wine, and excellent tobacco form another source of wealth. In addition, the mountains contain rich deposits of minerals, but copper and coal are as yet the only ones worked to any extent. Carpets made with pure wool and dyed with natural colours form one of the oldest industries.

The valleys of the Save, Drave, and Morava constitute the richest parts of the country. Zágreb (Agram) (150,000), in the upper Save valley, is the second town and market of the area. The western mountain system, with its limestone ridges running parallel to the coast, and with little surface water—a feature which is so

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characteristic of this *harst* type of country—is barren and thinly populated over a distance of sixty to a hundred miles from the coast.

The sea has penetrated the outer ridges, forming a fringe of long, narrow islands, with excellent harbours and fishing towns, but not ports. Spalato (Split) is the chief town on this coast. Ragusa (Dubrovnik) is a minor port



FIG. 129. THE INNER HARBOUR OF RAGUSA (DUBROVNIK)

Photo E.N.A.

for exporting fruit and eggs to Britain and importing coal and textiles. Cultivation is possible in this area only in the depressions formed by solution of the limestone with a floor covering of clay. These are called 'polyen.' The villages cluster round their edges. Fiume (49,000), the natural port, is occupied by Italy, but exports the timber, wheat, and flour of Croatia and Bosnia. The deep Narenta valley provides a route for the only railway from the coast to the interior. At Sarajevo the old Roman road which also used this valley branched to Salonika and to Nish. Lignite and some iron is mined near the head of the

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valley, while in the valley itself olives, oranges, lemons, pomegranates, and vines grow.

Belgrade (225,000) is the natural centre for routes from the south; particularly that from Constantinople by the Maritza valley to Nish (Nich) and that from Salonika and



FIG. 130. THE GORGE OF THE NARANTA, YUGOSLAVIA

Photo E.N.A.

Athens *via* the Vardar valley. On the other three sides marshes protect it, and the Danube and the Save confluence provides the routes. But the city is more important as a political centre than for its industries. Nish (37,000), similarly, is important mainly as a junction of routes.

Uskub, or Skoplje (72,000), in the upper Vardar valley, stands at the opening out of the valley. It is another of

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the market towns, and serves a fertile area as well as commands Y-shaped diverging routes.

ALBANIA

Albania is a country with a population of about a million, engaged in pasturing sheep and goats. The Albanians are a brave but revengeful people, by no means united, owing to their isolation among the mountains and to religious differences. The Christian population is separated: that in the north is Catholic, that in the south belongs to the Orthodox Greek Church, while between them, in the centre, the people are Mohammedans. Scutari (29,000) is the chief market town in the north. The best agricultural districts are in the south, where Koritsa, near the eastern frontier, is the chief town. Valona, on the coast, has good roads to Koritsa. 'Valonia' is a name given to tanning materials (oak-bark), and is a valuable product.

BULGARIA

Bulgaria occupies the eastern part of the peninsula, with the east-west Balkan Mountains forming the backbone. The northern rivers drain into the Danube and the south-flowing rivers into the Maritza. The northern slopes are loess-covered and very fertile, and the Bulgars are the best farmers in the Balkans. The population is nearly six millions. The wheat crop is more important than the maize. This is due to the fact that the winters are colder but shorter than in Yugoslavia, and that rain falls in early summer. Tobacco, sugar, and the vine are also important. Maize, oats, cotton, and flax are the other chief crops. Ruschuk (46,000) and other towns on the Danube have flour-mills, breweries, tanneries, and textile and carpet factories, which use wool from the mountain sheep. Electric power is provided by the rivers. Half the imports come through the Danube port of

THE BALKAN PENINSULA

Ruschuk. Varna (60,000), on the Black Sea coast, exports grain and timber. It is occasionally ice-bound, and Burgas (31,000) is proving a serious rival, and has factories for spinning cotton and silk. Grapes and other fruits, especially plums, grow on the slopes of the mountains near the Black Sea coast. Dairy-farming and poultry-keeping are widely carried on. Extensive forests of oak, beech, and



FIG. 131. THE SHIPKA PASS, ACROSS THE BALKAN MOUNTAINS
Photo E.N.A.

other deciduous trees cover the mountainous parts of the country, and raw and manufactured timber is exported to Turkey.

The Maritza valley forms the last portion of the Orient Express route through Belgrade, Nish, and Sofia to Constantinople. It has two distinct portions to its basin—the part of which Philippopolis (85,000) is the chief town, and the part around Adrianople in Turkey. The two are separated by a highland region through which the valley narrows considerably. Wheat and some rice are grown in the upper wetter part, while maize, tobacco, mulberry, and vine do best in the lower, drier part. At Adrianople,

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now once more a Turkish town, the Maritza turns south to the Ægean coast. East of Adrianople, which is noted for silk, the country is drier and steppe-like, and belongs to Turkey.

Sofia (213,000), the capital, stands in a mountain basin at a point where the east-west Orient route, following the Maritza, Nishava, and Morava valleys, crosses the route from the Danube (at Nicopoli), to Üskub in the Vardar valley *via* Kustendil. South-west of Sofia, at Pernik, good quality coal is mined. Oil-shales occur to the north-west, and foreign companies have been granted the right to work deposits of copper, manganese, lead, and zinc near Kustendil (15,000), which is also a fruit centre. Granite and marble are quarried extensively.

In the sheltered southern valleys of the Balkans, fruits do well. Kazanlik is famous for roses, grown for attar of roses. The mulberry is useful for the rearing of silkworms.

The general exports are grain, chiefly maize, tobacco, hides, skins, and attar of roses. The imports are mostly cotton and iron goods.

TURKEY IN EUROPE

The importance of this area lies in the command of the two peninsulas at Constantinople and Gallipoli. The fine harbour of the Golden Horn is mainly important to-day for the *entrepôt* trade in the produce of Asia Minor. Istanbul, or Constantinople (673,000), has, however, many natural advantages besides its splendid harbour. The promontory on which it stands is easily defended from attack, and thus it commands not only the sea route, but also the land route from Europe to the East (see Fig. 22, page 93). It enjoys also a genial climate, is well supplied with water, and in addition to its valuable import trade has a great fishing industry. Adrianople (35,000), at the confluence of the Maritza and Tunja rivers, is an important route centre and market town.

THE BALKAN PENINSULA

GREECE

The Greeks of classical times developed highly civilized city-states in their own country and planted numerous colonies around the Mediterranean coasts, and to this day Greeks are to be found in most Mediterranean ports. They had great pride of race, but not the gift of unity. Between their conquest by Rome and their independence secured in 1829, they had to submit to the rule of the Turks. Their national spirit and their skill as traders and navigators, gained for them privileges which enabled them to survive as a nation. But the present population of about six millions is of mixed descent. About one-third are sailors and fishermen, and the rest live chiefly by agriculture. A little iron, zinc, and lead are the only mineral products, and marble is quarried. Once more there exists a lack of unity due to separation by the mountains and islands. This disunion remains a cause of weakness.

The present republic consists of (*a*) the peninsular part of the Balkans; (*b*) the northern shores of the *Ægean*; (*c*) the Ionian islands on the west; and (*d*) the Archipelago in the *Ægean*, consisting of nearly five hundred islands. Even the peninsular part is broken up by mountains into isolated districts.

The northern region is known as Macedonia. It contains the lower valleys of the Vardar and the Struma. Rice is grown in this region, with the chief centre near Salonika. The chief town is Salonika (236,000), situated east of the Vardar delta, on the neck of the Chalcidice peninsula. It is the second city of Greece, and a great port. The Vardar valley, by which its railway connects with the Orient route at Nish, is a great factor in its importance. Its large annual trade consists of exports of tobacco, maize, olives, and animal products from the fertile plain and the interior, and of imports of textiles and iron goods.

Mount Olympus (9800 feet) separates Macedonia from another lowland area, known as Thessaly. It is bounded

THE COUNTRIES OF THE WORLD

by the Pindus Range (7800 feet) on the west and the Othrys Mountains on the south (3800 feet). Low hills divide the plain into two parts, with Trikkala, the chief town, on the upper, and Larissa on the lower basin, both with a population of about 20,000. The upper valley of the Peneius river provides a route to the north. The mountains are covered with thick woods of oak. Sheep and goats are reared in large numbers. But the plains are treeless. The climate is extreme—ranging from winter snow to a summer temperature of over 80° F. The alluvial soil grows good crops of wheat, barley, maize, cotton, and tobacco. Round Volos, the port, where the mountains provide shelter from the bitter north-east winds, Mediterranean fruits are successfully grown with the help of irrigation. Chestnut-trees, which grow on the higher slopes, provide fuel.

Athens (453,000), the capital and largest city, is of the greatest historical importance. Like Rome, it occupies a hill site near the sea, and is rich with architectural treasures. Four miles away is the port of Piræus, the chief port of the whole country.

To the south is the Morea (Peloponnese), joined to the mainland by the isthmus of Corinth, four miles wide, and cut by a canal. The mountains reach 7000 feet in many places, and are largely limestone. Narrow lowlands opening southward are cultivated; for example, round Sparta. Forests of oak and fir grow on the slopes, but the richest part is round the Gulf of Corinth, where vines yield the small grapes which are dried for currants. Patras (61,000) is the collecting centre, and nearly 100,000 tons are produced annually.

One-sixth of Greece consists of islands. The inhabitants have to be skilful navigators and traders. Most of the shipping of the eastern Mediterranean is managed by them.

The Ionian islands, off the west coast—Corfu, Zante, and others—have a denser population than the mainland. The climate is mild, so that tourists are attracted to the

THE BALKAN PENINSULA

beautiful scenery, and ample crops (chiefly olives, currants, and figs) are obtained from the rich volcanic soil.

The Archipelago in the Ægean Sea is usually grouped into the Sporades in the north, Eubœa, and the Cyclades in the south. Cultivation is carried on whenever possible—fruits on terraced slopes, with melons and vegetables amongst the orchards. Sheep and goats, as everywhere in the peninsula, utilize the mountain pastures. The chief town of the Cyclades group is Hermopolis (21,000), on Syra. With its fine harbour and coaling station it makes an ideal centre for trade. The long island of Eubœa has forested hills and cultivated valleys in the north, but becomes wild and desolate southward. It produces magnesite, iron ore, and coal of fair quality. Marble is quarried. Round Chalcis (17,000), the chief town, the currant vine is cultivated. On the mainland, opposite, in the Laurium district, south of Athens, iron is mined. Other minerals, including lead and zinc, are present, but not much worked. There is no large manufacturing industry. Apart from shipping and agriculture, the only industries are the making of olive oil and wine, home spinning of cotton, wool, and silk, and some soap and chemical manufactures, with water-power at Laurium.

CHAPTER XXII

THE MEDITERRANEAN AND THE ATLANTIC

THE MEDITERRANEAN

FROM Gibraltar to the Syrian coast (*i.e.*, along latitude 36° N.) is a distance of 2400 miles. The northernmost extension of Mediterranean waters nearly reaches latitude 46° N. in the Adriatic, while to the south, in the Gulf of Sidra, it nearly reaches latitude 30° N.—*i.e.*, a maximum width of 1100 miles. But, as the map shows, this vast area of water is much broken up by peninsulas and islands. The fold mountains of the Italian peninsula and of Sicily form a vast bridge approaching close to the African coast. This natural partition clearly divides the sea into eastern and western basins.

Leaving out of account the Adriatic and *Ægean* arms of the sea, the eastern basin lies mainly south of latitude 36° N., while the western basin is north of this latitude. The eastern basin is the larger and has a more extensive area of deep water. The two are separated by relatively shallow water, viz., less than 1200 feet between Sicily and Africa. The deepest parts attain 12,000 feet in the western and 14,000 feet in the eastern basin.

Reference has already been made to the structure of the lands bordering the Mediterranean, the diversity of which results in a great variety of type of coast. In the western basin coasts are often bold and steep, as along the Riviera; but there are considerable lengths of coast of a low and shelving type, as along the west of Italy and the south of France. On the whole, both are smooth in outline, but the Riviera coast is broken into a series of bays, which is one of the attractions of the region. In the eastern basin, the southern or African coast is low and

THE MEDITERRANEAN

sandy, with the delta of the Nile forming a feature comparative to that of the Rhône delta. But the northern coasts are of infinite variety. The western coast of the Adriatic is smooth, with shallow water; the eastern coast is rugged and has deep water close to the shore. In each case the mountain systems run parallel to the coast, but in the case of the Dinaric mountain system on the east, some of the ridges have subsided and become submerged, forming a fringe of islands. Along the west coast of Asia Minor the coast runs at right angles to the 'grain' of the mountains, and the bays are the end of the valleys flooded by the sea—a *ria* coast. The western shores of the Ægean are mostly rocky cliffs overlooking deep bays, both the result of faulting. But there are also coastal plains in some parts, as along the northern Ægean shore.

The diversity of the lands bordering the Mediterranean has produced rich variety of culture and civilization. But the real importance of this great sea lies in the fact that it penetrates far into the heart of the great land masses and provides a route between the Atlantic and the East. This was so before the Suez Canal was built, but the Suez Canal enhances this aspect of importance. The gateways to the sea through the encircling highlands are therefore of immense value and relatively few in number. The chief are:

(1) The Rhône valley; (2) the Vardar-Morava valleys leading to the Danubian countries; (3) the Nile valley, providing a lane through the desert, which as a barrier takes the place of mountains—a valley that is, however, little used as a route; (4) the Straits of the Dardanelles and Bosphorus, giving access to the Black Sea and the Russian plain; and (5) the railways which tunnel the Alps from the north Italian plain. Note especially the Brenner route to Germany, the St Gotthard route to Switzerland, and the Mont Cenis route to France. Trace also the Simplon route and that which uses the Semmering Pass between Trieste and Austria.

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To keep this great sea highway secure for shipping, the nations chiefly concerned have established naval stations

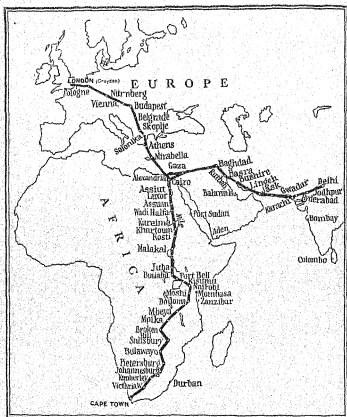


FIG. 132. IMPERIAL AIRWAYS ROUTE TO SOUTH AFRICA
Imperial Airways, Ltd.

at strategic points. Britain holds the key to both ends of the sea, making use of the rocky peninsula of Gibraltar as a fortress, and keeping chief control of the Suez Canal.

THE MEDITERRANEAN

Guarding the gateway between the eastern and western basins, France has Bizerta on the African coast, and Britain the island of Malta. Italy protects the port of Genoa with the naval station of Spezia, as Toulon protects Marseilles. Most of the liners from western Europe call

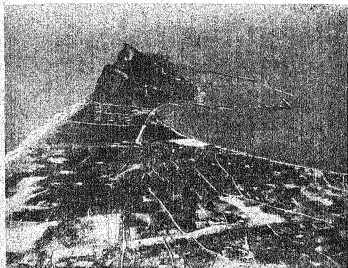


FIG. 133. ROCK OF GIBRALTAR SEEN FROM THE AIR

Photo E.N.A.

at Marseilles on their way to the Suez Canal. Several lines also start from Marseilles, Genoa, and Trieste.

Reference has already been made to some of the islands. Mention must also be made of Corsica, Malta, Crete, and Cyprus. *Corsica*, which belongs to France, stands in mountainous isolation to the north of Sardinia, off the main sea routes. Radiating spurs further isolate the inhabitants of one valley from those of another. Brigandage and feuds are still common among these sturdy islanders, whose lives are mainly occupied with somewhat primitive

THE COUNTRIES OF THE WORLD

cultivation of the usual Mediterranean products. They export timber from what remains of the forests of chestnut, oak, and pine.

Malta is about the size of the Isle of Wight, but quite different in character. It is mostly a high limestone plateau, the surface of which has few trees to shade it. By terrace cultivation, varied crops are secured, which, however, are inadequate for the large population, many of whom migrate to adjacent lands and to America. Water-supply is a difficult problem and water has to be carefully stored.

Crete too is mountainous but much larger. It presents a steep face southward. Along the gentler slopes of the north coast, where the chief towns are found, are fertile plains growing fruits. Grain is grown in a valley on the southern side. Crete belongs to Greece. Discoveries within recent years have revealed a civilization of a remote age known as Minoan. The present population is of mixed race, some of whom profess Christianity, others Moham-medanism.

Cyprus is British. The name refers to the copper found there in early times and still worked. The capital, Nicosia, stands on a plain between the two mountain ridges which run east and west. The people are of mixed race, being chiefly Greek. Cyprus also finds difficulty in securing an adequate water-supply. But by afforestation, and other means taken to preserve the moisture in the soil, the winter rainfall is stored. Fruits and grain can be grown by irrigation, and the population is fairly prosperous. Sponge-fishing is one of the occupations.

As regards the sea itself, the eastern basin, lying farther south, is warmer and more sunny, and also receives less rainfall and river water than the west. It is consequently saltier. The comparatively shallow Strait of Gibraltar (1200 feet) shuts off the deep water of the Mediterranean from the Atlantic. The water temperature falls from 75° F. at the surface to 55° F. at 750 feet, and then remains

THE ATLANTIC

constant to the bottom, whereas in the Atlantic it continues to fall to 37° F. at the bottom. The fresher waters of the Atlantic and of the Black Sea therefore flow inward as surface currents, while the denser, saltier Mediterranean water moves outward underneath it. The Black Sea is not much saltier than the Baltic, but the Mediterranean is nearly three times as salt as the Baltic. There is no great rise and fall of tides, so that rivers tend to form deltas and currents along the shores, and in some places build up spits and sandbanks enclosing lagoons.

THE ATLANTIC

Balanced about the equator, the Atlantic extends from the Arctic to the Antarctic Circle, varying in width from 1800 miles (between Cape San Roque and West Africa) to over 4000 miles in the south. Owing to the great plains which border it, it receives one-third of the water of the river basins of the world. Besides the chief rivers of Europe (except the Volga) it receives the waters of the Nile, Niger, Congo, and all the important African rivers, except the Zambesi and Limpopo; the Rio Grande, Mississippi, and St Lawrence of North America; the Amazon, Orinoco, and La Plata of South America.

About one-quarter of its area is less than 1000 fathoms deep, and half is less than 3000 fathoms. There are eighteen areas, known as 'Deep,' where this depth is exceeded, and these are distributed along either side of a central ridge of the ocean bed, which can be traced from north to south, the larger area of deep water being on the west. The Nares Deep reaches nearly 28,000 feet. On the whole the North Atlantic is deeper than the South, and is deepest near the West Indies. Yet it has a greater area of shallow waters and also inland seas of great importance: the North Sea and the Baltic, the Mediterranean, Hudson Bay, and the Gulf of Mexico, while the St Lawrence and the Great Lakes are, in effect, another arm of the ocean.

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But the South Atlantic has no such branches, and its coasts are smoother and less indented than in the North.

The larger and more important islands, therefore, are in the North Atlantic. Those on the shallow continental shelf are known as continental islands, and include the British Isles, Newfoundland, and the Canaries. Those on submarine ridges are known as oceanic islands, and include many, but not all, of the West Indies, the Azores, Cape Verde, Ascension, Tristan da Cunha, and several others.

Prevailing winds set the waters in movement, taking the form of currents. Tides also produce important movements of water around the shores of the continents. The effect of wind is confined to the surface water and is never felt deeper than 600 feet. Currents originate in regions of steady winds in one direction. Where deep the currents are called 'streams,' and where shallow 'drifts.' They are said to be warm or cold in comparison with the air over them. Remember it is the *air* that is warmed or cooled over these currents which affects the climate of neighbouring lands, and not the currents themselves. The chief warm currents originating in equatorial water are the Gulf Stream of North America and the Brazil Current in the South Atlantic. The Labrador and Benguela Currents are cold.

Upon the floor of the ocean various deposits are found. Near land the deposit consists of the earth waste brought down by rivers and spread out by tidal movements. Much of it takes the form of fine blue mud. Far from land are found oozes, composed of microscopic limy or flinty shells. The flinty forms are called Radiolaria and Diatoms (plant forms). In the 'deeps' stiff red clay is found.

Fisheries. East and west of the North Atlantic, in the shallow waters of the continental shelf, are the greatest deep-sea fisheries of the world. These are the 'banks' from Cape Cod to Labrador; those of the North Sea, and off the coasts of Norway, Iceland, and the Farøe Islands. The Pacific has such a fishing region round the north of

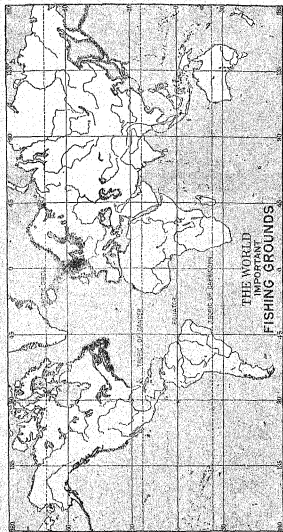


FIG. 134. THE IMPORTANT FISHING GROUNDS OF THE WORLD

From "Modern Business Geography," by Ellsworth Huntington and Sumner W. Cusking (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

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Japan. The factors accounting for the importance of these fishing areas are: (1) shallow water, where fish can spawn on the sea floor; (2) great quantities of algæ provide food for the smaller fry on which larger fish feed; (3) a cool climate enables the catch to keep fresh under salt in the ships' holds; (4) abundant harbours encourage seafaring skill; and (5) inhospitable soil and climate make agriculture difficult and fishing necessary.

The British fisheries land over a million tons a year, a harvest that is worth £20,000,000. The most important kinds of fish are herring, cod, haddock, whiting, plaice, and other flat fish. But more important still is the training it provides for courage, endurance, and skill, qualities upon which the naval and merchant fleets of the world depend, and no country more so than Britain.

Ocean Traffic. The most important shipping routes in the North Atlantic follow the shortest great-circle course between the British and European ports, from Hamburg to Cherbourg, and Montreal or Quebec in Canada, or New York, Boston, Philadelphia, and Baltimore in the United States. But the Canadian ports in winter are Halifax and St John. Goods traffic consists chiefly of manufactured goods from Europe, and grain, meat, and dairy produce from America.

In the South Atlantic the chief routes connect the ports of South America to Western Europe. Liners usually call at the Spanish and Portuguese ports, and either at the Canary Islands, or the Cape Verde Islands for coal. Traffic consists chiefly of animal products, grain, and coffee from South America, iron and steel goods, coal, and textiles from Europe. In addition there is the important route from Europe to the Cape.

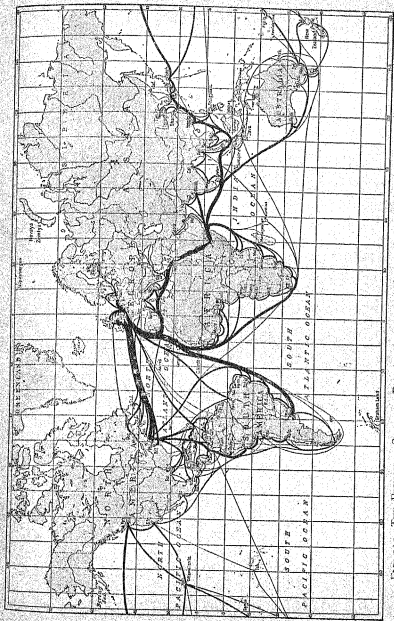


FIG. 135. THE PRINCIPAL SHIPPING ROUTES OF THE WORLD, SHOWING RELATIVE VOLUMES OF TRAFFIC
 From "The New World" by *Isaiah Bowman* (The World Book Company and George G. Harrap & Co., Ltd.)

PART III

AMERICA—NORTH AND CENTRAL

CHAPTER XXIII

NORTH AMERICA

THE New World was the term applied to the American continents after the discovery of North America in 1492. The name is still appropriate, for the two continents are isolated by great oceans on the east and west, which separate them from the Old World. From Vancouver to Yokohama is over 4000 miles, and from Quebec to Liverpool nearly 3000 miles. This has its advantages to the countries of America, for the agricultural markets of Asia are but little more distant than the industrial area of Europe. As land is continuous from about latitude 72° N. to 54° S. the two continents form one great barrier to easy communication between Western Europe and Asia. Though colonized from Europe, independence was easily won at so great a distance.

The two Americas have many superficial similarities. Both are triangular in shape, with the broad base in the north. But it is more important to note that this brings the widest part of North America near the Arctic Circle, while South America is widest near the equator. Thus most of North America is in temperate latitudes, while the larger part of South America lies between the tropics. There is also a mighty mountain system following the west coasts of both, and in each case the main ridges diverge to enclose great tablelands—the Great Basin in North America and the Bolivian plateau in South America. Each continent has a central plain, with a low watershed

NORTH AMERICA

separating the northern portion from the southern, drained in the one case by the rivers Hudson, Nelson, and St Lawrence, and the Amazon and Orinoco respectively, and in the other by the rivers Mississippi and Plata respectively. Further, there is a broad, flat highland area to the east of the plains—viz., Labrador peninsula and Brazil. But North America is larger, on the average higher, and has over twice as much coast, and twice as large a population as South America. More important still are the marked differences of climate, productions, and human activities. So that South America will be considered more in comparison with Africa and Australia than with North America.

The main physical divisions of North America have already been indicated—viz., the western mountain system, the central plains, the Appalachian mountains, and the Atlantic coastal plain. These divisions can best be described in dealing with the life and activities of the inhabitants. But first we must consider the main features of climate and natural vegetation.

Climate. In a country extending so near to the North

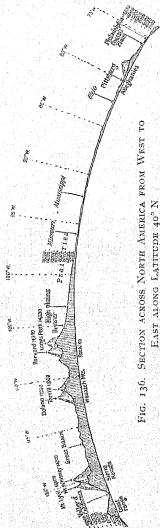


FIG. 136. SECTION ACROSS NORTH AMERICA FROM WEST TO
EAST ALONG LATITUDE 40° N

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Pole and the equator and so wide from east to west, there must be great differences of climate. The influence of the great mountain system is also great. Ocean currents too play a great part. Taking the last first, we know that the warm currents driven by the trade-winds into the Caribbean Sea and Gulf of Mexico emerge through the Strait of Florida, flowing as the Gulf Stream along the coast, until about latitude 35° N., when after meeting the Labrador Current, it becomes the North Atlantic Drift, which is carried along by the westerly winds. The cold Labrador Current similarly follows the coast, bringing not only fog to Newfoundland when it meets the warmer water from the south, but also icebergs into the track of the ocean liners. Its influence is felt as far south as Cape Hatteras. On the west coast, however, the warm waters of the North Pacific Drift alone influence the coast of British Columbia, for there is practically no cold current through the narrow Bering Strait. These currents affect the climate by either chilling or warming the winds which pass over them.

On the west coast, the continuation of the warm Kuro Siwo Current has less effect than that of the North Atlantic Drift upon Europe, for its volume is small in proportion to the vast Pacific Ocean. The Drift impinges upon the coast near the mouth of the Columbia river. Some of its waters turn northward, to moderate the winters of British Columbia; some flow southward, cooling the Californian coast, as the Canaries Current does North-west Africa.

Over the continent the seasonal variation of pressure and winds is less marked than in Asia, where the land mass is larger. In winter the high-pressure area spreads over the continent, and the pressure is highest in the region of the Great Basin. There is often a detached area of high-pressure over the south-east of the States. But it is not continuous, and is often modified by the progress of cyclones from the low-pressure areas of the North Atlantic and Pacific. These cyclones travel more rapidly than in Europe. Over much of Canada westerly winds prevail in

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winter. In the Mississippi Valley and the coast of the Gulf of Mexico the prevailing winter winds are northerly. The warm south and south-west winds of British Columbia are confined to the coastal area partly by the lofty mountain wall and partly by the continental high-pressure

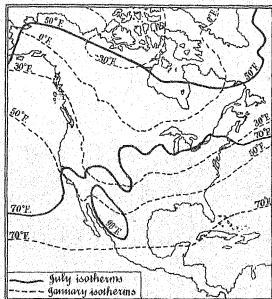


FIG. 137. JANUARY AND JULY ISOTHERMS OF NORTH AND CENTRAL AMERICA (AT SEA-LEVEL)

system. Southward, along the Californian coast, the winds are north-westerly or north. In summer the continental low-pressure area forms a trough joining the equatorial low-pressure belt to that of the North Atlantic. Again this is less marked than in Asia, and less constant. In the east and south the winds are from the reverse direction of those in winter. On the west coast the westerlies reach farther into the continent. The absence of any real barrier

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between Hudson Bay and the Gulf of Mexico renders the central plains liable to sudden changes from a cold northerly wind to a warm wind from the Gulf. For the same reason the south-eastern states are subject to violent

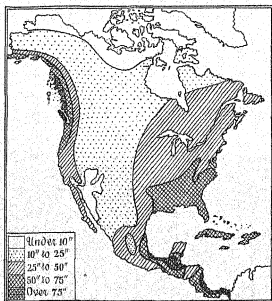


FIG. 138. MEAN ANNUAL RAINFALL OF NORTH AND CENTRAL AMERICA

cyclones or hurricanes, which are set up by unstable conditions when a stream of cold air meets one that is warm.

The temperature conditions are clearly indicated by the isotherms, which show how distance from sea lowers the winter temperature and increases summer heat; for example, the winter isotherm of 32° F. crosses the west coast in British Columbia, curves southward as far as the confluence of the Mississippi-Ohio, and then turns northward, to reach the coast again near New York. This means

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that north of this line there is more than one month of continuous frost. In the extreme north, frost lasts nine months. To the south of the isotherm, the winter temperature rises steadily to about 70°F . The coasts are everywhere warmer in winter than the interior in the same latitude. In summer the isotherm of 60°F . crosses the coast near San Francisco, but then follows it as far north as Alaska, before it curves eastward toward the estuary of the St Lawrence. This indicates how much hotter the interior is than the coast. In the south-west there is a large area where the temperature is over 90°F . For actual temperatures allowance must of course be made for altitude.

Rainfall depends so much upon pressure and winds that it is not surprising to find the wettest part, with an annual rainfall of 100 inches, along the Pacific coast of Canada. The barrier effect of the mountains is clearly marked both by the desert plateaux enclosed by the ranges, and by the low rainfall, 10 to 20 inches, of the plains between the Rockies and longitude 100°W . Rainfall increases again south and east of that line to a maximum of 70 to 80 inches in the Appalachians. Rain falls at all seasons along the east and west coasts, mostly in summer in the plains, and mostly in winter in California, where Mediterranean conditions are found.

These factors produce the following chief climatic regions:

- (1) West coast of Canada—abundant rain at all seasons, and mild, equable temperatures, a climate similar to that of Britain.
- (2) California—hot, dry summers and mild winters, with winter rains, as in the Mediterranean.
- (3) The enclosed plateaux of the western mountains, which have great extremes of temperature between summer and winter, and also between day and night, combined with very scanty rainfall.

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- (4) The great plains, which also have very cold winters, with snow in Canada, decreasing westward and and southward, and hot summers, with moderate summer rains.
- (5) The east of the United States and Canada, which



FIG. 139. NATURAL VEGETATION OF NORTH AND CENTRAL AMERICA

have rain at all seasons, with cold winters and fog in the north, due to the Labrador Current, and warm summers; and in the south mild winters and hot summers.

Certain of these regions could be further subdivided to bring out the variations which such large areas comprise. **Vegetation.** The map shows the succession of vegeta-

NORTH AMERICA

tion belts which merge gradually one into the other.

(1) *Tundra* from the Yukon to the Nelson and in North Labrador. (2) A belt of *coniferous forest* reaching from Alaska to California, on the west coast mountains, and stretching across North Alberta, Saskatchewan, most of Manitoba, Ontario, and Quebec, including the Great Lakes, on to Labrador. (3) Temperate, *deciduous forests* over the eastern provinces between the St Lawrence and the south coast. (4) The *Prairies* between the Rockies and the Mississippi. (5) *Tropical forests* in many parts of Mexico, Central America, and the West Indies. (6) *Deserts* on the enclosed plateaux.

This natural distribution of vegetation has been much modified by man's activities, so that forests are continually being cleared either to be replanted or brought under other forms of cultivation, and the natural grasslands used for the cultivation of cereals. In the same way the natural animal life is continually undergoing change. The herds of bison on the prairies no longer exist, except in reserved areas. Cattle, horses, and sheep, under the care of the 'cowboy' herdsmen, have taken their place. (See page 75 for a summary of contrasts between the east and west of the continent.)



CHAPTER XXIV

CANADA, NEWFOUNDLAND, AND THE BERMUDAS

CANADA

IN the early days the rivers and lakes formed the chief highways, and the Indian with his light canoe, made of birch bark, sewn together with sinews or fibres and made watertight with gums and resin, could pass easily from one river to another, across the portages, and readily repair any damage with the materials furnished by the forests. Excellent for light travel, the canoe is useless for carrying goods in bulk, and modern Canada has to transport such goods great distances. The vast size of Canada impresses every one who visits it. It takes six days by railway to cross from Vancouver to Halifax, and when it is noon at Halifax it is only 8 A.M. at Vancouver. Till railways came, Canada was a series of isolated units. British Columbia, colonized from the Pacific, was cut off from Ontario as though it were on the other side of the world. The Hudson Bay Territories were detached from both. Even to-day 6,000,000 out of a population of nearly 10,000,000 live within 300 miles of the southern boundary—i.e., along the railway lines. The railways make union possible; they enable the people, whether of French, British, or other descent, to regard themselves as Canadians; and they unite the whole country to the rest of the British Commonwealth of Nations. Airways, waterways, and railways, therefore, possess special importance, and the Government has constructed a series of important canals to link the lakes and river systems. Air-navigation is utilized on a large scale, particularly in northern Canada.

From Port Arthur and Fort William, on the western

CANADA

shores of Lake Superior, immense quantities of wheat and other products are taken by the 'whale-back' steamers across the lake, a day's journey. Between Lakes Superior and Huron are the 'Soo' canals, one on the Canadian side and two in the United States, by which the falls of Sault Ste Marie are avoided. The tonnage amounts to 92,000,000 a year, nearly three times that of each of the Panama and

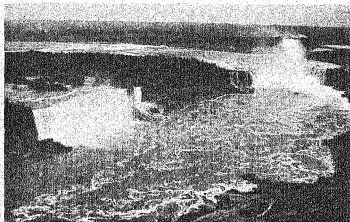


FIG. 140. NIAGARA FALLS

View from the Canadian side.

Photo Canadian Emigration Office

the Suez Canals, although frost closes the Soo canals for five months in the year. The goods consist of grain, iron, lumber products, and coal.

In Lake Huron the traffic is swelled by that from Lake Michigan. The St Clair and Detroit rivers provide a natural link with Lake Erie. From the eastern end of Erie traffic proceeds either *via* Buffalo, and the Erie Canal to the Mohawk and Hudson valleys at Albany for New York or by the Welland Ship Canal into Lake Ontario. Traffic to the extent of over 7,000,000 tons a year passes

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 through the Welland Ship Canal (twenty-five miles long),
 which avoids the Niagara Falls. Between Lake Ontario



FIG. 141. DIAGRAM OF NIAGARA FALLS AND SURROUNDING COUNTRY

Photo Canadian Government

and Montreal the channel of the St Lawrence has many obstructions, but shipping needs are met by deepening the channel in some places, and in others by constructing

CANADA

canals past difficult stretches. The Soulanges, Beauharnais, and Lachine are all St Lawrence canals—the last avoids the falls of the same name, and provides entrance to Montreal through the river island. The distance from Port Arthur to Montreal is 1215 miles. These canals are being improved so that ocean-going vessels can reach the Lakes.

From Ontario the Rideau Canal connects Kingston to Ottawa, which is also linked by river canal to Montreal. The Chambly Canal links Montreal to the river Richelieu near Lake Champlain. The Trent river canal connects Lake Ontario to Georgian Bay in Lake Huron. There is also a canal from the Atlantic Ocean to the Bras d'Or lakes in Cape Breton. The Canadian Government has appointed a commission to study afresh the proposal to construct a waterway across the Isthmus of Chignecto, which joins New Brunswick with Nova Scotia. This canal would be eighteen miles long. Its construction would provide a short cut between St John and Montreal, and bring the West Indies and South American ports nearer to Montreal by two days' sailing of an ordinary cargo boat. Similarly, the products of Prince Edward Island and northern New Brunswick, would be brought at least 450 miles nearer to the markets of the eastern United States. Another projected canal between Georgian Bay in Lake Huron and Ottawa river would shorten the Fort William and Montreal route by 300 miles. The total length of existing canals is about 1600 miles.

At Montreal goods are transferred to ocean-going steamers. But while navigation seasons are being prolonged the severe winter still closes the waterways for some months, and the railways take over the traffic east and west.

Railways. The 41,000 miles of Canadian railways constitute 5 per cent. of the railways of the world. Although the United States has seven times this length, Canada has more miles of railway *per capita* of population than any

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other country. More than half are now state-owned, and known as the Canadian National Railways. The rest, totalling over 15,000 miles, belong to the Canadian Pacific Railway Company. No one with imagination can fail to be stirred with the story of the construction of this railway, which was completed in 1885, nor does the traveller to-day watch the wonderful scenery reveal itself mile by mile without a thrill at man's triumph.



FIG. 142. NEW MONTREAL BRIDGE

Photo Canadian Government

From St John the route runs north-west to the banks of the St Lawrence, which it follows and crosses to enter Montreal by a fine bridge. From there it follows the Ottawa valley to the Dominion capital, and then goes westward through the forests of Ontario to Lake Nipissing and the mining town of Sudbury, following the north shore of Lake Superior to Port Arthur. Leaving the Great Lakes, it passes between the Lake of the Woods and Lake Winnipeg to reach the great junction and grain centre of Winnipeg. Onward across the rising grain-growing prairies, through Brandon to Regina, and through the

CANADA

occasional cattle-ranches and oilfields to Calgary, it approaches the mountains by the Bow river to zig-zag its way to a height of nearly a mile, where it plunges into the tunnel beneath the Kicking Horse Pass. Emerging into the forested Columbia river gorge, it tunnels again through



FIG. 143. LAKE LOUISE, IN THE VALLEY OF TEN PEAKS,
CANADIAN ROCKIES

Photo Canadian Government

the Selkirk Range to reach a lower portion of the Columbia valley. Then through the Gold Range to Thompson river and on by the Fraser river to Vancouver.

Important branches serve (1) the Lake Peninsula from Montreal *via* Toronto to Detroit (U.S.A.); (2) the Lake Superior mining district, Sudbury and Sault Ste Marie; (3) Edmonton *via* Portage la Prairie, and Saskatoon; (4) the coal, gold-mining, and fruit-growing region *via* Medicine Hat, Crow's Nest Pass, Kimberley, and Trail;

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and (5) the United States (Minneapolis) *via* Sault Ste Marie, *via* Winnipeg, and *via* Moose Jaw, near Regina. Railways join the two countries also at several other points.

The Canadian National Railways are an amalgamation of the former lines, namely, the Intercolonial from the all-the-year-round ports of Halifax, St John, and Sydney, crossing the St Lawrence by a huge railway and highway bridge from Levis to Quebec; the Grand Trunk Pacific (Winnipeg to Prince Rupert); the Canadian Northern (Toronto and Montreal to Vancouver); and the National Transcontinental (Moncton, Quebec, Winnipeg). The transcontinental line now links Halifax and Vancouver, *via* Moncton, Quebec, and a northerly route round Lake Nipigon to Winnipeg; or *via* Saskatoon, Edmonton, Yellowhead Pass (3700 feet), and (a) by the Thompson valley to Kamloops, and by the Fraser valley to Vancouver; (b) by the Fraser and Skeena valleys to Prince Rupert. Thus in crossing the prairies the Canadian National serves the more northerly territory, whereas the Canadian Pacific takes the more southerly route. There are connexions to this northern route from Montreal, Toronto, and other southern towns. An important line from The Pas, Manitoba, has been constructed to Hudson Bay at Churchill, but the bay is free from ice for only three months of the year. Churchill is much nearer to Liverpool than Montreal. This route will cheapen the cost of wheat, cattle, dairy produce, and mineral transport, and ease the congestion through the Lakes between the harvest and the closing by ice.

The Canadian National Railways have a total of over 22,000 miles of track, and serve all the principal seaports and cities of the Dominion, as well as large areas of agricultural lands. This vast system, with its network of telegraph lines and its chain of hotels across the continent, is under one management. Linking as it does the shipping traffic of both the Atlantic and Pacific Oceans, it also forms a vital part of an important route round the world.

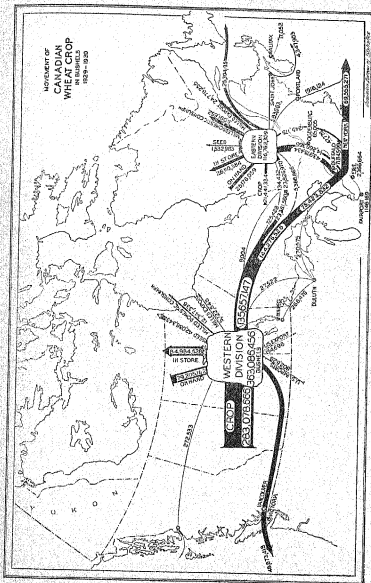


FIG. 144. MOVEMENT OF THE CANADIAN WHEAT CROP
Report of the Dominion Bureau of Statistics on the Grain Trade of Canada, 1939

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The transport of the grain from the harvest fields involves a wonderful transport organization. Machinery is used at every possible stage. The wheat is reaped and threshed in the field by the 'combines.' The bags of grain are taken to the nearest railway-station, and usually stored temporarily in an elevator. As the harvest accumulates, long trains carry the grain to Vancouver, or Churchill, or to Fort William and Port Arthur, on the shores of Lake Superior. In handling the grain from the trains into the huge elevators, or from the elevators to the ship, and finally from the ship at its destination, advantage is taken of the fact that grain flows like a liquid. By machinery it can be handled in bulk very cheaply. As the St Lawrence is usually closed to shipping by ice from the end of November to the following April, it is very important to get the wheat through to the markets quickly. Much of the wheat is milled and exported as flour. Most of the wheat from Alberta and western Saskatchewan is dispatched to Vancouver. Much grain still leaves by United States ports, but Montreal handles vast quantities of United States grain and imported Argentine maize.

Eastern Canada. Owing to the inflow of cold air over the Labrador Current the winters are very cold and the summers are warm, but the extremes of temperature are modified in the region of the Lake Peninsula. There is ample rainfall. Snow falls plentifully, usually before the severe frosts set in.

The province of *Nova Scotia* includes Cape Breton Island. It is a hilly and heavily forested peninsula, composed of much glaciated old crystalline rocks. Coal, iron, and some other minerals are found. Nova Scotia furnishes half the total output of Canadian coal. Coal is worked at Pictou and Cumberland. Sydney, in Cape Breton Island, has iron- and steel-works, supplied with local coal, and iron from Newfoundland. The many harbours of the rocky east coast form the base for fishing, cod, halibut, mackerel, herring, and haddock being obtained from the Banks, and

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lobsters and oysters round the coasts. Half the Canadian export of fish comes from these regions.

Lumbering and agriculture are the chief occupations of the interior. The forests are composed of fir and pine, spruce, birch, and oak trees. The Annapolis valley, in

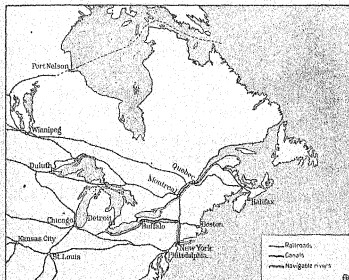


FIG. 145. EASTERN CANADA

From "Modern Business Geography," by Ellsworth Huntington and Sumner W. Cushing
(The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

the sheltered south-west, is the most fertile part. Fruit, especially apples, hay, oats, and potatoes, as well as some wheat and barley, are the best crops. The cool, moist climate favours good pasture for dairy-farming. Rich mud deposited by the high tides (60 to 70 feet) of the Bay of Fundy makes excellent grassland.

Halifax (64,000), the capital, a fortified naval station and port, is six hundred miles nearer to Liverpool than

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New York. Important as a railway terminus and ocean port, it is famous also for its fish-market. It does a considerable trade with the West Indies. Halifax is chiefly a passenger port, but has a growing industrial area near. Only when Montreal is closed by ice are goods shipped in large quantities.

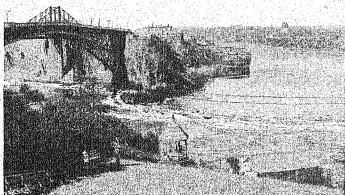


FIG. 146. REVERSIBLE FALLS, ST JOHN, NEW BRUNSWICK
The water at these falls flows one way when the tide is out and the other way when it is in.

Photo Canadian Emigration Office

New Brunswick also possesses rich forests (chiefly spruce) and fisheries. Paper and pulp are the principal manufactures. But the main occupation is agriculture (oats, wheat, barley, and potatoes), dairy-farming, and cattle-breeding. Oil-shales occur in the south-east, and coal, iron, manganese, and other minerals are as yet undeveloped. Fredericton, the capital, is the head of navigation of St John river. St John (60,600) is connected with Montreal by two railway routes. High tides keep the port open, so that many steamer lines use it in winter.

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Formerly wooden ships were built there. It has sawmills and an export trade in live stock and dairy produce. The harbour of this port contains one of the world's largest dry docks. Moncton (17,500) is an important railway terminus, with considerable manufactures, including tanning, boot-making, and the manufacture of cotton and woollen goods.

Prince Edward Island. Nowhere more than 400 feet high, the island is about one hundred and fifty miles long, and varies from five to fifty miles in width. Rich red soil and adequate rainfall favour dairy-farming as the chief pursuit. Potatoes and oats especially, but also wheat and barley, are grown. Horses are bred for the lumber camps of the mainland. Pigs, sheep (of Persian breed), and poultry are also reared. The industry of breeding fur-bearing animals like the black and silver fox, the beaver, mink, and sable, is proving a successful experiment. Charlottetown, the port, is the capital, and has oyster and other fisheries. A ferry crosses Northumberland Strait to the mainland daily.

The *St Lawrence Lowlands* lie between the glaciated plateau of Labrador and the Highlands of New England. The plains broaden considerably above Quebec. Occupations are manufactures, fishing, dairy-farming, and stock-raising along the banks of the river, grain and fruit-growing in favoured spots like the Richelieu valley, maple-sugar making and lumbering in Quebec and the Appalachian Highlands. Quebec is estimated to have 130,000,000 acres of forests of pine, spruce, and larch. Felled and hauled in the winter months, the logs are piled on the river banks, and when the spring thaw occurs they are floated down to the mills, placed usually near waterfalls. The making of wood-pulp for paper and artificial silk, planks, pit-props, and joinery occupies the lumber-men in summer.

The province of Quebec is also rich in minerals, though there is no coal. Most of the world's asbestos, namely,

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85 per cent., is found along the St Lawrence, and there are copper, gold, silver, lead, and zinc mines. Here, too, are the world's largest aluminium works.

The St Lawrence lowlands contain some of the chief cities and towns of Canada, and are a hive of manufacturing industries. Quebec (135,000) is famous historically, and is important both as a transcontinental terminus and



FIG. 147. TRAPPERS IN THE FORESTS OF CANADA

From "Canada To-day and Yesterday," by David W. Bates

because it is the lowest bridge town of the St Lawrence. Quebec is no longer the highest port for ocean-going steamers, but it retains considerable trade. Having immense water-power within transmission distance, and local resources in raw material, its industries centre round timber, paper, tanning, and leather-work, but cotton goods are also made. It is the centre of French-speaking Canada.

Montreal (over 1,000,000) is some two hundred miles farther up the river. It is one of the world's great cities, owing to its command of routes: (1) from the west *via* (a) the Great Lakes and St Lawrence, and (b) Ottawa, and

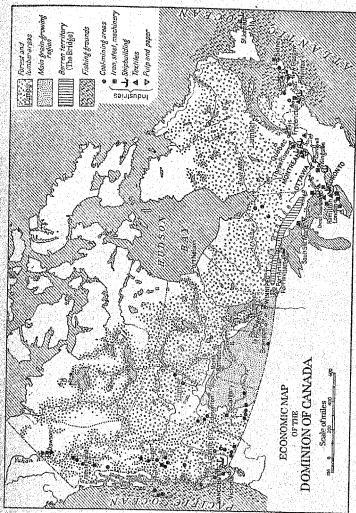


FIG. 148. ECONOMIC MAP OF THE DOMINION OF CANADA

From "Modern Business Geography," by Ellsworth Huntington, and Sumner W. Cushing (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

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(2) from New York (420 miles) and the south *via* the Hudson-Champlain route. It is the junction for ocean-borne, river, and railway traffic. What London is to Britain Montreal is to Canada, but Montreal is a thousand miles from the open sea. This explains the freezing of the river during five winter months. To Montreal are brought grain, hides, wool, and ores from the west, timber and furs from the north, dairy products, fruit, foodstuffs, and manufactured goods from the Lake Peninsula and the St Lawrence, and machinery, manufactured cotton goods, and other products from the United States and Europe. Hydro-electric energy from the neighbouring power sites make possible every kind of manufacture: flour, sugar, leather, locomotives, motor-cars and machinery, furniture, clothes, brewing, and distilling. Magnificently laid out, it is as typical of modern Canada as Quebec is of the past.

Ottawa (165,000), the capital, is nearly a hundred miles up the Ottawa river. Standing near the Chaudière Falls, and at the confluence of the Rideau river, it is at once an important route and political centre, and the focus of the lumber trade. Its central position and the risk of jealousy among the larger cities account for its choice as the home of the Dominion Parliament, with its fine buildings.

Ontario. This province extends more than a thousand miles each way, and contains one-third of the population of Canada and some of its principal centres of manufacture, but this is chiefly concentrated in the Lake Peninsula. The northern part is similar in character to northern Quebec. There are vast areas of ancient crystalline rock, sometimes bare, but mostly covered with a thin layer of soil, upon which only pine and fir trees can flourish. Mining and lumbering are often the only possible occupations, but there are considerable areas of alluvial soil being brought under cultivation, particularly near Sudbury and to the west of Lake Superior. At present, however, its mineral wealth attracts chief attention. In order of value the productions are gold, copper, nickel (90 per cent. of

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the world's supply), silver, and cobalt. Copper and nickel are mined at Sudbury, silver and over half the world's supply of cobalt at Cobalt, gold at Kirkland Lake and Porcupine. Canada ranks next to South Africa in the production of gold. Iron occurs plentifully, but is little worked owing to the distance from coal. Between Lakes Huron and Erie, in the south-west of the peninsula, there



FIG. 149. A PEAR ORCHARD, WESTERN ONTARIO

are petroleum-wells and natural gas. There is lignite coal in the north, and abundant water-power everywhere.

In the south, however, there is considerable agriculture in the form of mixed farming, fruit-growing, and stock-raising. Organization on a co-operative basis in regard to dairy produce and fruit has increased prosperity. The influence of the Lakes on the temperature and rainfall is chiefly to delay spring and autumn. Thus fruit is prevented from premature growth and from the danger of late frosts. Even grapes, cherries, apricots, and peaches, as well as other fruits, and also maize, can be grown,

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chiefly in the sheltered south-east round Hamilton and St Catharines. This region produces three-quarters of Canada's fruit. Ontario now surpasses Alberta as a cattle-rearing province.

Toronto (690,000) is the second city of Canada and capital of the province. It has an excellent harbour on the west shore of the lake, in the centre of the most fertile district. Water-borne coal from the east, enormous available power from the Niagara Falls and Gatineau and St Lawrence rivers, timber products and raw materials from the west, and excellent railway communications favour manufactures, especially those connected with light industry. Toronto is therefore Canada's second manufacturing centre. The university and Parliament buildings are notable features of this fine city. Hamilton (134,000) is a steel-working centre, with numerous general manufactures. Kingston manufactures breakfast foods, flour, iron and leather goods, and, like all the Lake ports, has grain elevators and a shipbuilding industry. London is a market and distributing centre for dairy produce and vegetables. With abundant water-power and cheap coal from Pittsburg it has metal-works, canneries, shoe and tobacco factories. Ontario has most of Canada's automobile factories.

The Prairie Provinces. The climate of these interior plains is extreme. The winters are extremely cold and long, and the summers hot. Rainfall is light and occurs chiefly in summer—*i.e.*, in the growing season. Owing to the severe frosts preceding appreciable snowfall, wheat is sown in spring, when the warm *Chinook* wind from the west assists the thaw.

Manitoba, Saskatchewan, and Alberta lie between the parallels of 49° N. and 60° N. These provinces have been developed only since the building of the railways. Fifty years ago they were scarcely known, and the only settlements were small villages. In 1871 Winnipeg had 215 people; in 1901 42,000; to-day it has 336,000. A similar

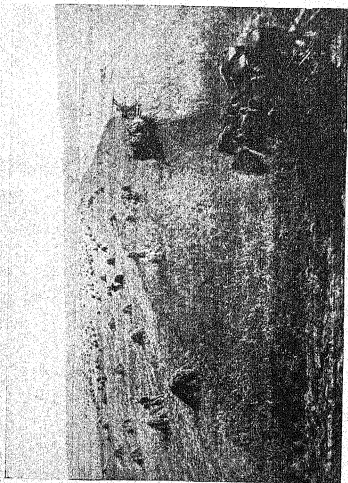


FIG. 150. REAPING ON THE PRAIRIE
By courtesy of the Government of Quebec

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expansion has taken place in other towns, and will continue.

The open, treeless prairie makes railway construction easy. In contrast to eastern Canada, there are vast areas of the richest soil. The soil, the continental climate, and agricultural machinery enable enormous areas of wheat to be sown and reaped between spring and autumn. Scientific selection of seed, irrigation, electricity, the motor-car, telephones, and now the wireless, all these factors combined enable the farmer to keep in touch with his neighbours and the world, with markets and prices, to receive weather forecasts, and to push the wheat crop farther and farther westward and northward, so that for nearly a thousand miles from west to east and for three hundred miles from north to south all is one big farm. In addition to the agricultural industry there are also mines and manufactures and oilfields.

The prairies are high level plains. Lake Winnipeg is 800 feet above sea-level. Between two and three hundred miles farther west a low escarpment marks the higher prairie, which rises steadily for five hundred miles, with an average height of over 1000 feet. A third area rises still higher at the Missouri-Coteau escarpment, and the average is between 2000 and 3000 feet in Alberta. The grain-growing area begins in the rich Red river valley, once a great lake, south of Winnipeg, and extending into the United States. Note that this is near 100° W. (See page 75.)

The part of these provinces north of 55° N. belongs in structure and character to the Laurentian Plateau, like Northern Ontario and Québec. Mining, lumbering, fur-trapping, and lake-fishing provide the chief means of livelihood. Mineral deposits are very rich. The value of the mineral production in Alberta is about six times the total for Manitoba and Saskatchewan. But the total for the three provinces combined is less than half that for Ontario.

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The rich farming of the southern areas due to glacial drift soil, is mainly, though not wholly, confined to wheat, barley, and oats. With the increase in population, mixed farming is spreading. Besides other grains, root-crops, including sugar-beet, vegetables, flax, hemp, and hay for dairy cattle, are grown; bee-keeping and stock-raising are common.

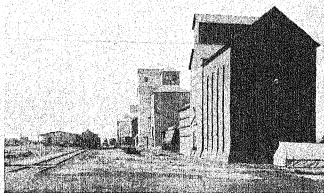


FIG. 151. GRAIN ELEVATORS AT A COUNTRY STATION
IN THE PRAIRIES

Photo Canadian National Railways

If *Manitoba* is the 'Keystone' province, as it may be described owing to its central position, *Winnipeg* (336,000) is the pivot of the Dominion. Its position is not unlike *Chicago* in the United States. Not only do all the trans-continental railways of Canada converge upon it to avoid the lakes to north and south, but it is the half-way city, and the *Red river* valley is a gateway to the United States. Although there is a difference of sixty-eight degrees between summer and winter temperatures, and as much as sixty degrees of frost, the absence of wind and the bright sunshine associated with the winter high-pressure makes life pleasant even in winter. *Winnipeg* stands at the

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confluence of the Assiniboine and the Red rivers, and the prairie extends fifty to sixty miles east of it. It is not only the greatest grain market of the Empire, but also a great market for furs, timber, and cattle. With the power provided by the Winnipeg river its manufactures are numerous, including flour-milling, leather-work, and the making of farm machines. Brandon is the second city of the province.

Saskatchewan in normal years ranks by far the first of the three provinces in the highest yield of wheat. In this province a harder variety of wheat is grown; the summer days are long, and the winter frosts destroy insect pests. The population of Saskatchewan is at present only 751,000, but as it grows mixed farming increases. Animals are reared in large numbers. Coal is produced in the south-east, in the Souris river region; copper and zinc, gold and other minerals, as well as clay for pottery, are available, so that manufacturing is increasing. Regina (67,000), the capital, and Saskatoon have growing industries.

Alberta benefits from the *Chinook* winds from the mountains, which, like the *Föhn* of the Alps, become warmed and dried by compression, and melt the snows quickly, allowing sowing in the autumn ('the Fall'). Irrigation and dry farming are encroaching more and more on the natural grasslands of these high prairies. But rainfall is scanty, and as a result the rivers cut themselves deep into their beds far below the level of this country. Besides cattle, hogs are being raised in increasing numbers. Butter-making and mixed farming too are growing.

Alberta has great reserves of coal, estimated to be 14 per cent. of the world's supply. A semi-anthracite is worked near Banff, bituminous coal near Lethbridge and Drumheller, lignite at Edmonton and elsewhere, while the province has also natural gas and petroleum wells and refineries. Edmonton (69,000) is the provincial capital. Railways radiate from it to north and south, east and west. It is at the head of navigation of North Saskatchewan

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river, and is the centre of a coalfield. Coal is used for local manufactures and is despatched to the prairie towns. But it is also the second most important market for furs from the northern forests, and a cattle market with growing meat-packing industries. Calgary (102,000) is the



FIG. 152. BOW RIVER, FAIRHOLME RANGE, AND TUNNEL MOUNTAINS, CANADIAN ROCKIES

Photo Canadian Government

biggest city between Winnipeg and Vancouver. Like Edmonton, it is important as a railway centre. It is the chief cattle and wheat market of the province, for the Government has carried out extensive irrigation works from the river Bow. With coal and oil and water-power near at hand, it has numerous industries—oil-refineries, tanneries, foundries, railway rolling-stock works, sawmills, meat-packing works, and dairies.

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The chief passes in the Canadian Rockies are as follows:

- (1) In the north the Peace river cuts a gap a mile wide at 2000 feet, and provides easy access between the Peace and Fraser valleys.



FIG. 153. A VIEW IN THE ROCKIES

- (2) Pine river and Smoky river afford difficult crossings.
- (3) Yellowhead Pass (3700 feet), near Robson Peak, to Fraser river and Prince Rupert.
- (4) Kicking Horse Pass (5300 feet), on the C.P.R. route.
- (5) Crow's Nest (4450 feet), on the southern Canadian Pacific Railway route, to Kootenay district.
- (6) North and South Kootenay Passes, both about 7000 feet.



FIG. 154. A GIANT TREE: BRITISH COLUMBIA

By courtesy of the Government of British Columbia

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British Columbia, Yukon, and the North-west Territories.

British Columbia lies between the parallels of 49° and 60° N. and between the Rockies and the Pacific. It includes also Vancouver Island, the Queen Charlotte and other islands which fringe the coast. Although the area of British Columbia is over four times that of Britain, the population is only about 500,000. The general trend of the mountains from north to south results in abundant rainfall on the western slopes, and the rivers wind their way to the sea in long valleys. But the Peace river in the north has cut a gap through the Rocky Mountains, and drains into the Mackenzie river.

Climatic conditions are very varied, but on the whole the climate, especially of the coast and lower valleys, is mild and temperate, with abundant rain. In the enclosed mountain areas greater extremes of temperature occur, and rainfall is often light. Agriculture, therefore, suffers from too much moisture on the coast, and too little in the interior valleys. But magnificent forests abound, and these, together with mineral deposits and fisheries, constitute the main resources.

The finest timber in the forests is found on the coastal ranges, where Douglas firs reaching a height of 300 feet, red and yellow cedars, the crimson-leaved maple (the national emblem of Canada), and other valuable types abound. British Columbia furnishes over half of Canada's lumber as compared with less than a fifth twenty years ago. Lumbering is carried on in summer as well as winter. Sawing often takes place on the spot, as the trunks of the trees are so large. Much hauling is done by cables worked by donkey-engines. The animals which live in the forest yield useful furs and skins.

The mineral output of gold, silver, lead, zinc, copper, and coal amounts to nearly a quarter of the output of the whole Dominion. Coal is mined at Nanaimo, in Vancouver Island, and near the Crow's Nest Pass.

The coal is used for shipping, railways, and manufac-

CANADA

tures. Trail, on the Columbia river, is the chief metallurgical and chemical centre, but the Klondyke field, on the river Yukon, in the extreme north, is also an historical gold-working district, of minor importance to-day.

The fisheries are a great source of wealth, and British Columbia produces nearly half the total for the Dominion.



FIG. 155. SALMON CAUGHT IN THE FRASER RIVER

Salmon ascend the Fraser, Skeena, and other rivers to spawn, and later are caught, canned, and cooked. The skilled labour of cleaning and cutting up the fish was at one time largely carried out by native Indians and Chinese. Canning of salmon is done in some sixty canneries, situated chiefly at New Westminster and Prince Rupert. Halibut and herring are also caught.

The fruit-growing industry is increasing in importance, particularly in the interior southern valleys and in Vancouver Island. Vernon, on Lake Okanagan, in the West Kootenay valley, is a famous centre for fruit, and typical

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also of the mixed farming which is carried on round many of the lakes and in fertile parts of the valleys. Some wheat is grown partly for the cattle-rearing industry and partly for local needs.

The largest city is Vancouver (277,000), on the south shore of Burrard Inlet. Because of its deep, sheltered harbour it has been made the terminus of the Canadian National and Canadian Pacific Railways. Owing to the good coal found in Vancouver Island it has become the focus of the gold and base-metal mining ranges behind it, and of the timber, fishing, and fruit industries. It is not surprising, therefore, that Vancouver is the third city of Canada. Since the opening of the Panama Canal, wheat from Alberta and western Saskatchewan is shipped here. Liners leave regularly for Japan (ten days), China (fourteen days), Australia (three weeks), and there is coastal traffic with American ports in Alaska and Puget Sound, and to San Francisco (830 miles). Fruit-preserving (with imported sugar), shipbuilding, railway plant, saw-milling, furniture, silk and other textiles, and fish-canning are among its industries. Vancouver is the largest port on the Pacific coast of America.

The capital, Victoria (39,000), at the south-east of Vancouver Island, is seventy miles from Vancouver. Originally a Hudson's Bay Company settlement, it is still the headquarters of a seal-fishing fleet. The approach to its good harbour is narrow and winding. But being situated near a great coalfield, it has considerable shipping traffic and shipbuilding, lumbering, and canning industries.

Near Victoria is Esquimalt, with the largest dock for repairs on the Pacific coast. Nanaimo (9000), opposite Vancouver, is the chief coaling station of the Pacific coast. The industries are herring-fishing, fish-curing, and saw-milling. There is also a railway to Victoria, and a daily steamer service to Vancouver, which is thirty-five miles away. New Westminster (15,500) is the Fraser river port

CANADA

and a former capital. It is a great canning town, has sawmills, and is a market for dairy produce. Prince Rupert (7500), at the mouth of the Skeena river, is the northern railway terminus. Its splendid harbour is 550 miles north of Vancouver, and 500 miles nearer to China and Japan than Vancouver. The fish caught off Queen Charlotte Islands and timber are exported, and there are steamer services to Alaska and to southern ports.

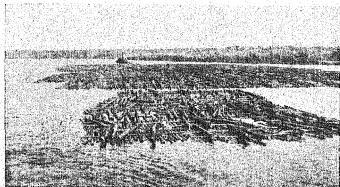


FIG. 156. LUMBER RAFT

Stewart, the most northerly port, is a mining centre for gold, silver, and copper. It stands at the head of a fjord near the Skeena valley and the Alaskan boundary.

The plateau region drained by the Yukon and its tributaries is inhabited by four to five thousand people. Owing to the long frosts and short, hot summer, cultivation is restricted to hardy cereals and vegetables. The natural vegetation is of the tundra type in the north, but spruce forests abound in the south. Bears, moose, caribou, and fur-bearing animals are found. But the chief industry is the mining of silver, lead, gold, and other ores. Coal is found near Dawson, the chief mineral centre.

The North-West Territories constitute a vast area of

THE COUNTRIES OF THE WORLD

glaciated plateau, divided into the three districts of Mackenzie, Keewatin, and Franklin. The chief river is the mighty Mackenzie, over 2500 miles long, flowing to the north, and frozen during the winter. There are numerous great lakes. The population consists of a few thousand Indians, Eskimos, mineral prospectors, and trappers. The Eskimos mostly inhabit the coasts and islands, living on seals, fish, and caribou. The 'forts,' or townships, are



FIG. 157. A NEWFOUNDLAND VILLAGE

By courtesy of the High Commissioner for Newfoundland

mainly fur-trading posts. Southward of the tundra is the coniferous forest, commencing with small, stunted trees, but developing farther south into good forest of spruce and pine. Important copper, silver, and radium deposits are being opened up on Great Bear Lake, and the copper ores in the Coppermine river valley are being examined. Petroleum wells exist at Norman, on the Mackenzie river. Reindeer herds are being introduced from Alaska. Transportation is mainly by seaplane, caterpillar tractor train, and motor-canoe, and communication by radio, telephone, or telegraph.

NEWFOUNDLAND

NEWFOUNDLAND

This island is a separate Dominion, and the oldest British colony. It has retained independence of Canada because economic facts link it rather with Europe than with Canada. The fact that it is an island, dependent upon



FIG. 158. SALMON LEAPING A WATERFALL

By courtesy of the High Commissioner for Newfoundland

the fisheries of the Grand Banks, from which the Canadian provinces obtain more than sufficient fish for their own needs, compels Newfoundland to find markets in Mediterranean countries and South America (the Roman Catholic states). Similarly, wood-pulp and paper from the spruce forests is the property of London owners. Imports of manufactured goods, clothing, etc., can be obtained as easily from Britain as from Canada. Cape Breton Island is sixty miles away (Cabot Strait), though Labrador is

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only twelve miles off at the strait of Belle Isle. The heavy rainfall and cold, marshy ground are not good conditions for agriculture, and though there is coal in the south-west and iron in Belle Isle, apart from some copper production, the working of minerals has not yet been fully developed. The chief agricultural products are hay, potatoes, and cabbage.

Of the fish caught, the cod is all-important both for drying in the sun for 'stock' fish and for cod-liver oil. These products form more than half the exports. Lobsters and salmon are taken in home waters and rivers. From St John's (41,000), the port and capital, a railway runs through the fishing villages in the north and past the falls working wood-pulp factories. The cable from Valentia (Ireland) crosses Newfoundland to Canada. St Pierre and Miquelon are French islands—all that remain of French possessions in North America. Labrador, on the mainland, forms part of the colony. It is a wild tract of country, thinly inhabited with Indians and Eskimos, but possessing valuable forests and water-power in the south, and important coastal fisheries.

THE BERMUDAS

The group of coral islands, 32° N. of the equator, is remarkable, for the coral polyp will not live in water cooler than 70° F. Their presence in these latitudes is therefore due to the warm ocean currents. Though small, these islands are valuable to the Empire, since they are within a thousand miles of the West Indies, the United States, and Nova Scotia. As a dock and victualling station, Bermuda is an important base. The genial climate attracts visitors, and favours the production of early vegetables and flowers. Hamilton (3000) is the chief town.

CHAPTER XXV

THE UNITED STATES OF AMERICA

THIS wonderful country, practically the same size as Europe, productive of larger crops of wheat, maize, cotton, and tobacco than any other country, with the greatest supplies of coal, iron, copper, and petroleum in the world, has a population of over 120,000,000, speaking English, but including immigrants from every European country, and 10,000,000 negroes or coloured people. A century ago the total population was not much larger than that of Greater London to-day. Within a hundred years the whole country has been occupied, and there is little unproductive land. Most of the early inhabitants came from Britain or the northern states of Europe. But latterly considerable numbers from South and Eastern Europe have been admitted. Immigration is now restricted to about 250,000 a year. So that America has not yet had time to weld together into one nation these differing types of peoples, who continue to use their own languages, and to think of their own interests rather than America. But the abundance of energetic labour combined with the natural mineral resources have made America the richest country of the world. It must be remembered, therefore, that every aspect of its geography is on a larger scale than in any of the countries of Europe, and that only the most important details can be dealt with here.

THE WESTERN STATES

Owing to the mountainous country, these states contain less than a tenth of the whole population. The Rocky Mountain and other systems, or Cordillera, consist of

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mighty mountain chains, enclosing vast plateaux. The plateaux of Yukon, British Columbia, Idaho-Oregon-Washington, the Great Basin, Colorado, and Mexico are all deeply carved by river action. In Canada the width of this mountain belt is about five hundred miles, but in the United States in latitude 40° N. it is more than a

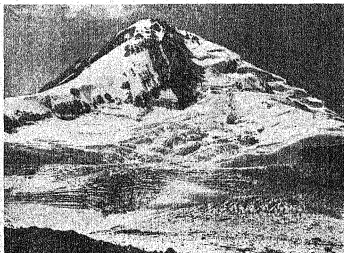


FIG. 159. OREGON: MOUNT HOOD AND ELIOT GLACIER

Photo Will F. Taylor

thousand miles wide, and the mountains which enclose the plateaux rise to peaks between three and four miles high.

The Columbia Plateau. Generally speaking three series of ranges can be recognized: Rockies, Sierra Nevadas or Cascades, and Coast Ranges. Note that in Canada the term 'Coast Ranges' is used for the combination of the Cascades, since the real Coast Ranges appear only in islands. Between the Rockies and the Cascades lies the volcanic Columbia Plateau, deeply cut by the Columbia river. The Snake tributary of the river Columbia rises

THE UNITED STATES

The abbreviation commonly employed for the names of the states is given in brackets

THE WEST

STATES	LARGEST CITY
<i>Mountain:</i>	
Montana (Mont.)	Butte
Idaho	Boise
Wyoming (Wyo.)	Cheyenne
Colorado (Colo.)	Denver
New Mexico (N. Mex.)	Albuquerque
Arizona (Ariz.)	Phoenix
Utah	Salt Lake City
Nevada (Nev.)	Reno
<i>Pacific:</i>	
Washington (Wash.)	Seattle
Oregon (Oreg.)	Portland
California (Cal.)	Los Angeles

Total area 1,477,000 square miles
 Total population 11,900,000
 Total value of manufactures (1927) £890,500,000

THE MIDDLE WEST

STATES	LARGEST CITY
<i>East North Central:</i>	
Ohio	Cleveland
Indiana (Ind.)	Indianapolis
Illinois (Ill.)	Chicago
Michigan (Mich.)	Detroit
Wisconsin (Wis.)	Milwaukee
<i>West North Central:</i>	
Minnesota (Minn.)	Minneapolis
Iowa	Des Moines
Missouri (Mo.)	St. Louis
North Dakota (N. Dak.)	Fargo
South Dakota (S. Dak.)	Sioux Falls
Nebraska (Nebr.)	Omaha
Kansas (Kan.)	Kansas City

Total area 755,000 square miles
 Total population 38,500,000
 Total value of manufactures (1927) £3,973,400,000

THE SOUTH

STATES	LARGEST CITY
<i>East South Central:</i>	
Kentucky (Ky.)	Louisville
Tennessee (Tenn.)	Memphis
Alabama (Ala.)	Birmingham
Mississippi (Miss.)	Jackson
<i>West South Central:</i>	
Arkansas (Ark.)	Little Rock
Louisiana (La.)	New Orleans
Oklahoma (Okla.)	Oklahoma City
Texas (Tex.)	Houston
<i>South Atlantic:</i>	
*Delaware (Del.)	Wilmington
*Maryland (Md.)	Baltimore
District of Columbia	Washington
*Virginia (Va.)	Richmond
W. Virginia (W. Va.)	Huntington
*North Carolina (N.C.)	Charlotte
*South Carolina (S.C.)	Charleston
*Georgia (Ga.)	Atlanta
Florida (Fla.)	Jacksonville

Total area 878,000 square miles
 Total population 37,800,000
 Total value of manufactures (1927) £1,787,700,000

THE EAST

STATES	LARGEST CITY
<i>New England:</i>	
Maine (Me.)	Portland
*New Hampshire (N.H.)	Manchester
Vermont (Vt.)	Burlington
*Massachusetts (Mass.)	Boston
*Rhode Island (R.I.)	Providence
*Connecticut (Conn.)	Hartford
<i>Middle Atlantic:</i>	
*New York (N.Y.)	New York
*New Jersey (N.J.)	Newark
*Pennsylvania (Pa.)	Philadelphia

Total area 162,000 square miles
 Total population 34,500,000
 Total value of manufactures (1927) £4,516,900,000

The thirteen original states are marked *.

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in the Yellowstone National Park, on the watershed of the Rockies, and flows through a region of scanty rainfall, where it has cut a gorge-like valley 4000 feet deep. The Columbia valley, open to the westerlies which bring abundant rain, has the broad, open valley typical of moist regions. In the coastal states of Washington and Oregon,



FIG. 160. A LOG RAFT ON COLUMBIA RIVER, OREGON

Photo Will F. Taylor

conditions are similar to those in British Columbia, with agriculture (wheat, maize, vegetables, and fruit), lumbering (spruce, cedar, and fir), and sea and river fisheries. Both cattle and sheep are raised in large numbers on the valley and mountain pastures. One-quarter of the western forests are national property, managed by the State Forestry Service. Most of the revenue goes to the Treasury, and the remainder to the state in which the forests are, to be spent on schools and roads. The *sequoias* ('big

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trees") and redwoods are gigantic—300 feet high and 25 feet in diameter, the growth of more than a thousand years. Their size makes difficulties for the lumber-men. Yellow pine and Douglas fir are sawn and sent down to Seattle, Tacoma, and Portland. From these towns timber is dispatched to Pacific coast ports, and through the Panama Canal to East America and Europe. Box-making for fruit-packing is important. Although only a little coal occurs in Washington, and some copper, silver, and lead, the numerous falls furnish abundant water-power, and the Willamette Valley and Puget Sound may become great manufacturing districts. Spokane, near one of the falls, is the centre for the wheat-growing area, and has flour-mills.

The *Great Basin* lies between the Sierra Nevada and the Wasatch Range. The surface is irregular, and ranges cross it. There are several depressions containing lakes. Hemmed in by mountains there is little rainfall, and the streams drain to inland lakes, where evaporation keeps pace with supply, making them salt. The largest river is the Humboldt, flowing to a lake with no outlet. Some areas, like Death Valley and Salton



FIG. 161. A GIANT SEQUOIA,
SEQUOIA NATIONAL PARK,
CALIFORNIA

This tree is said to be 4000 years old.
It is nearly 300 feet tall. Note the
horse at its base.

Photo E.N.A.

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Sink, are depressions several hundred feet below sea-level. But the most famous is the Great Salt Lake, 2000 square miles in area. Salt Lake City (120,000) is a prosperous town in an area made fertile by irrigation, producing crops of grain, vegetables, and fruit. The original settlers were the pioneers of irrigation in the United States, and founded the Mormon Church.

The Yellowstone National Park (size of East Anglia) is a plateau 7000 feet above sea-level, with abundant evidence of volcanic activity, geysers, hot springs, and old volcanoes. It is a vast natural geographical exhibit, with mountains 10,000 feet high surrounding it, canyons, waterfalls, lava flows, and acts as a sanctuary for birds and animals threatened with extinction, like the moose, bison, antelope, and bear.

The *Colorado Plateau*, five to ten thousand feet high, south of the Great Basin, is bounded by the Rockies on the east, the Wasatch on the west, and the Uinta mountains in North Utah. The Green river rises in the mountains of northern Wyoming. The Grand river joins it 400 miles to the south, and these two rivers form the Colorado, which flows south-westward for 200 miles, then westward for 150 miles, and finally for 300 miles southward into the Gulf of California. The total length of the Colorado river, including its windings, approaches 2000 miles. The rainfall of its basin is less than 10 inches, and the river depends upon the mountain snows. Practically the only erosion is along its bed, which has been cut down as by a saw, leaving the walls of its canyon almost vertical where the rocks are hard, and less vertical where they are softer. This deep-cut course has been maintained, although earth movements have faulted the rocks into great tilted blocks, the surface of which in many places slopes the opposite way to the course of the river. But the river, thousands of feet below—a mile at the deepest part of the canyon—flows steadily along the bed it has graded itself. The tabular mountain masses, which are separated from

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one another by these canyons, are called *mesas* (Spanish, a 'table'), and the smaller ones *buttes*.

These dry, sandy lands of the west, where irrigated,

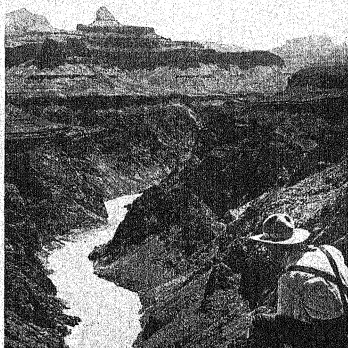


FIG. 162. THE GRAND CANYON OF THE COLORADO RIVER, ARIZONA

Photo Will F. Taylor

grow good sugar-beet. The southern part of the plateau is reserved for Indians. They are skilled at handicrafts, stock-raising, and grow good crops. Near the mouth of the Colorado, the Mohave Desert, to the west, and the Gila Desert, to the east, remind us that this is a region of the north-east trade-winds.

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The Californian Valley. Between the Sierra Nevada and the Coast Range is the rich and genial valley of California. Lying between latitudes 35° N. and 40° N. on the west of the continent, it enjoys similar climatic conditions to the Mediterranean. The rivers, notably the Yosemite, descend the Sierra Nevada slopes in falls, and have spread out alluvium on the valley below. The Sacramento from the north and San Joaquin from the south, fed by the rain and snow of the Sierras, unite to make their exit to the sea, which has cut a gap in the centre of the Coast Range and flooded the lower part of the valley. All the Mediterranean fruits do well in this valley; wheat and barley are grown extensively in the north, rice and some cotton in the south. California leads the states in the production of gold from the Sierra Nevada and the southern part of the San Joaquin valley; and the Coast Range produces nearly a third of the total output of petroleum. Fruit, however, is the produce for which California is most widely famed. Grapes, figs, oranges, as well as apples and berried fruits, are sent to the populous eastern states. In addition, quantities are dried or tinned for overseas markets.

San Francisco (634,000) stands at the Golden Gate, through which the trade of California passes to and fro. It is the chief industrial city as well as the port, milling flour, canning fruit, manufacturing woollen goods and other products, and building ships. The lack of coal is made up by abundant water-power and petroleum. As a port it has the advantage of having no competitor near, so that railways and shipping converge upon it, and the Panama Canal furthers its prosperity. It has frequently suffered from earthquakes, but owing to its important position it has always been rebuilt.

Sacramento (94,000) is the state capital, on the river and railway routes.

Los Angeles (1,238,000), famous for its film industry, is now larger than San Francisco. It is near the southern

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oilfields, and rich crops of wheat and fruit are grown with the aid of irrigation.

The Western States form an important mining area: copper is worked at Butte City in Montana, and also in Arizona and Utah; gold in California and Colorado, and

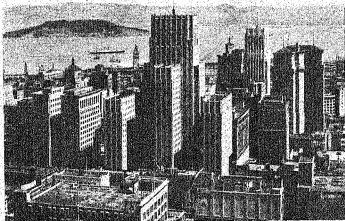


FIG. 163. SAN FRANCISCO TO-DAY

These skyscrapers have been erected since 1906, when the city was almost entirely destroyed by an earthquake, followed by a fire.

Photo E.N.A.

at Helena in Montana. Utah is the leading state for silver. There is also coal, but deeply buried, and not worth working at present. The industrial towns are found at the valley openings through the Rockies—Helena on the Missouri, Cheyenne on the Salt Lake City route, Denver on the South Platte, Pueblo on the Arkansas, Santa Fé near the Rio Grande, and El Paso on the Rio Grande at the Mexican boundary. Denver is the centre for the mining

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districts of Colorado and New Mexico; for smelting, and the manufacture of mining machinery. It is also the market for agricultural produce from the irrigated lands, and a centre for stock-raising, both of which are carried on in the high 'parks' round the headwaters of the rivers. These intermontane plains are vast in extent, and this makes up for the poor quality of pasture. Most of the



FIG. 164. THE 'BAD LANDS' OF SOUTH DAKOTA

Photo E.N.A.

cattle after three years are sent to the lower plains of the Dakotas and Nebraska to be fattened on corn and alfalfa, prior to sending to Kansas City or Chicago. Where the rocks are porous, the land is absolutely barren. These areas are known as 'Bad Lands' in South Dakota and 'staked plains' in New Mexico and Texas, because stakes were put by pioneers to mark out the path to water.

THE NORTH CENTRAL STATES

The twelve states given in the table are known as the Middle West, and hold nearly one-third of the total population. This area is one of the most important farming

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areas of the world, and having valuable minerals, contains many manufacturing towns. The farming at present is of the extensive type—*i.e.*, large areas are planted to yield one crop a year, and little attention is paid to fertilizers or to weeds. The yield per acre is therefore much less than countries where intensive agriculture is practised, as in Britain, European countries, or in Egypt, where by fertilization, several crops are obtained. The vast area, the freshness of the soil, and facilities for transport make this extensive cultivation profitable in America. As in Canada, most of this area was glaciated. Soil was removed from some parts, leaving barren rock, but more generally rich, deep drift was deposited. The climatic conditions—particularly the cold, dry winters, the hot summers, with occasional but not heavy rain—are such that many of the crops could be grown almost anywhere. But as some do better than others in a particular part, there are well-defined belts where wheat, maize, cotton, tobacco, or sugar respectively are grown.

The Wheat Belt. Wheat is grown in every state of the union, but chiefly in two areas: from Maryland and Pennsylvania to the Dakotas and Kansas, and, as already stated, in Washington, Oregon, and California. The greatest production, two-thirds of the total crop, lies between longitudes 95° and 100° W., from Kansas northward, with a projection into Minnesota. Of this area the Red river valley, which varies from thirty to forty miles in width, being the bed of a glacial lake, is the most fertile. Here, owing to the severe frost, the wheat is planted in spring, as in Canada. But farther south, where this danger is less, 'winter' wheat is grown—*i.e.*, sown in autumn. In order to guard against drought the top soil is kept fine by harrowing. The towns store and mill the wheat. Minneapolis is the greatest flour-making centre of the world, and Milwaukee is another. Minneapolis (464,000) and St Paul (271,000) form twin cities at the head of Missouri navigation, and are supplied with power from

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the Falls of St Anthony. Many other manufactures are carried on, especially those connected with the lumber trade. The grain is shipped for export from Duluth and Chicago. Duluth also receives iron ore from the mines of the rich Mesabia range in Minnesota, and coal from the vast coalfield round Pittsburg, for its iron- and steel-works and for export.

The Maize Belt. Maize is the typically American crop. It is grown in every state, but the chief area extends from West Ohio to East Nebraska. It demands warmth by day and night, clear sunshine, and frequent light summer rains. King Corn is 'canned, popped, and milled,' flaked, made into cakes, and consumed in every possible way. It is the best cereal for fattening hogs and poultry, and thus goes to produce meat products. This area contains some of the greatest American coalfields, so that the cities are not only marketing towns but great manufacturing centres. The slaughter and packing or canning of meat is carried on at many route centres; for example, Chicago, Indianapolis, Cincinnati, St Louis, Kansas City, and Omaha.

Chicago (3,400,000) is the greatest of these cities. It is the second largest city in the United States. A century ago the population was only 1000. Beginning as a fur market, its growth is due to command of routes. There was an important portage here across the low divide between the lake and the river Illinois, which is now followed by canal. Land and water routes also meet at this point, which partly explains the development of railways around Chicago. All routes from the north-eastern states to the north-west must pass the southern end of Lake Michigan, and so Chicago is the greatest railway centre of the continent. Ores from the north and west, coal from the east, timber from Michigan and Wisconsin, and raw materials from all parts have led to industries of all kinds on the largest scale. Its iron and steel industry is immense, and railway plant, agricultural

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machinery, motor-cars, and much else is manufactured. Cincinnati (451,000) is another iron and steel centre for machinery and rolling-stock of all kinds. Furniture, boots, and clothing, pottery, soap, and other goods are also manufactured.

Detroit (1,573,000), like Chicago, is a meeting-place of land and water routes at Lake Erie. Founded in 1701 by the French, it developed a trade in wooden articles, especially vehicles. Later iron-smelting, milling, and meat-packing were added. But it now has the largest output in the world of motor-cars and engine parts. Cleveland (900,000), with similar facilities, is another steel city, making cars and machinery and building ships. Petroleum deposits are near, and a canal adds to its advantages. St Louis (822,000), at the Missouri-Mississippi confluence, was bound to become important. Both railways and waterways converge on it from all points. It is, therefore, a great distributing centre for grain and livestock. With coalfields both east and west of it, and metal ores obtained from south-west, it makes iron and steel goods, shoes, and clothing. Milwaukee (578,000) has similar industries to its near neighbour Chicago—viz., lumber and leather trade, as well as pork-packing, machinery-making, and flour-milling. Other large centres are Columbus, Akron (rubber tyres), and Dayton.

THE SOUTHERN STATES

These states are essentially agricultural, and population is therefore evenly distributed, except that it becomes thinner in the west and denser in the east, particularly on the coasts of Florida. Near the Mississippi the population is also denser. The important crops are cotton, tobacco, sugar, rice, vegetables, and fruit.

The *cotton* crop is second only to corn (maize) in value, and is more than half the world's supply. Of the remainder most comes from Egypt and India. The cotton plant

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needs a deep soil rich in lime, ample rainfall, 30 to 50 inches in summer, but plenty of bright sunshine. There must be seven months clear of frost for safety, an average January temperature of not less than 40° F., and an average July temperature of 80° F. It must also be protected from the grey beetle and boll weevil. As the crop has to be picked mainly by hand and gone over several times,



FIG. 165. COTTON-PICKING IN GEORGIA

Photo Will F. Taylor

abundant labour at low cost is essential, as well as cheap transport to cotton factories. The negro population furnishes the labour. All the southern states between and including North Carolina and Texas in the north, and the Gulf of Mexico in the south, grow cotton (excepting Florida). Florida at one time grew the best cotton, but the weevil pest destroyed this prosperity. South Carolina and Georgia similarly lack sufficient sunshine for the crop to do well. There are three areas of heavy production: (1) the uplands of the Atlantic plain; (2) along the flood plain of the Mississippi and the Arkansas; and (3) the lower

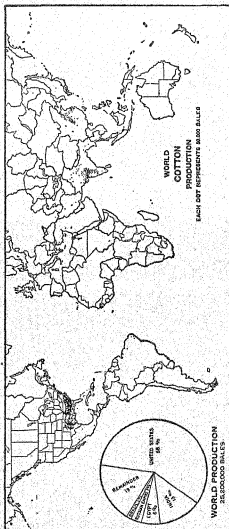


FIG. 166. COTTON PRODUCTION

From "Modern Business Geography," by Ellsworth Huntington and Sumner W. Cushing (The World Book Company, Yonkers-on-Hudson, and George G. Harrop & Co., Ltd., London)

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uplands of central Texas. This upland cotton has short and somewhat coarse threads, but it constitutes four-fifths of the supply. On the low islands off the south-east coast the 'sea island' cotton has a longer staple and is more silky and stronger. This is the best cotton.

The cotton plant is a shrub about four feet high. After four months' growth the bolls (about twenty per plant) are the size of a walnut. These burst a few at a time, and expose the snowy white fibres. Wind or rain spoils them, so they are picked promptly by hand. Then a machine with a revolving cylinder set with sawlike teeth separates the fibre from the seed. The seed is twice the weight of the fibre. It is crushed, and the oil obtained is like olive oil. It can be used as a substitute for butter, but chiefly it is made into oil-cake for cattle, and used also for making candles, and gramophone records. The fibre is compressed into bales weighing 500 lb. It is sent by the cheapest way, wherever possible by water. The cotton ports are Pensacola, Mobile, New Orleans, and Galveston on the south coast, and Charleston and Savannah on the east coast. Some is sent to the factories on the coalfields of Alabama and Tennessee, some to the towns at the river falls along the Atlantic coast, but most to the north-east states of New England, and about one-third of it to Liverpool. At the factory the washing, spinning, weaving, and dyeing involves at least forty processes, so that there is great opportunity for specialization.

Sugar is obtained from four plants—cane and sorghum in warm regions, beet and maple in cool regions. The United States grows all four. About half the supply comes from each pair. Sugar-cane needs a summer temperature of over 80° F. Frost kills it. South Louisiana is the chief area for sugar-cane in the United States, but the damage done by cold spells of weather from the north often necessitates planting afresh each year, whereas in the West Indies—particularly in Cuba—the cane will grow for from three to ten years. The bulk and weight of the cane-sugar

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crops make transport an all-important factor in competition with beet-sugar.

Both the cotton- and sugar-fields are occasionally devastated by the flooding of the Mississippi (see page 410) when snow melts in the upper basin. Its lower course is banked by levees, through which the swollen river breaks.

Rice requires a high temperature, and flat land which can be kept flooded two or three inches deep for three or four months. It is therefore suitable for warm, irrigated lands. The chief United States areas are south-east Texas, south-west Louisiana, and central Arkansas.

Tobacco will grow under varying conditions, but best in tropical or semi-tropical lands. It needs protection from frost and winds, and plenty of sun. But it takes considerable potash from the soil, and land where it is grown requires careful fertilizing. The tobacco-growing areas are therefore more scattered. The chief are the Virginia-Carolina coastal plains, Kentucky, the Connecticut river valley, Massachusetts, Louisiana, and Florida, and on the Lake Peninsula of Canada. Louisville, on the Ohio, is the greatest tobacco centre in the world, and also manufactures farming machinery. Richmond (Virginia), Raleigh and Durham (North Carolina), are other tobacco-manufacturing towns.

The cultivation of *vegetables* and *fruit* is of growing importance in the southern states. Florida, being quite free of frost, is especially important for fruit and early vegetables. The fruits include grape-fruit, pineapples, oranges, tangerines, and limes. Florida has a low, marshy coast, fringed with reefs and lagoons. On the west coast mangrove swamps occur, and in the extreme south tropical forests. Jacksonville and Tampa are the east and west coast ports respectively. In the south is the naval station of Key West connected by a railway which runs for a hundred miles across the shallow sea, using small coral islands as stepping-stones. Palm Beach and Miami are wealthy resorts on the east coast, and were recently

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devastated by one of the hurricanes which are characteristic of this region.

Hardwood forests abound in the eastern states—oak, hickory, walnut, chestnut, maple, acacia, and conifers, spruce and Fraser fir on higher slopes or sandy soils. In the south states evergreen forests replace the deciduous trees—cypresses in the swamps, Virginia oak, yellow pine on sandy soils, junipers (cedar glades), magnolias, and rhododendrons being typical.

As to *minerals*, iron ore is mined in the Appalachians, especially in Alabama, sulphur is obtained from Louisiana and Texas, and bauxite (for aluminium) from states round the southern end of the Appalachians and in Arkansas. The Ozark Plateau, an elevated area of old rocks west of the Mississippi on the borders of Missouri and Arkansas, produces great quantities of lead and zinc. Coal also occurs in the Arkansas valley and in the southern Appalachians. Nearly three-quarters of the United States output of petroleum comes from states west of the Mississippi, Oklahoma and Texas both producing more than California. In addition to these valuable supplies, water-power is plentiful in the south and along the Atlantic coast. Manufactures are therefore increasing.

New Orleans (458,000) is the largest southern city. It is the great market and port for wheat, maize, cotton, and tobacco. Other industries include cleaning and polishing rice, and the manufacture of sugar and wooden goods. It is well served by railways in every direction. The delta being swampy, New Orleans is built a hundred miles upstream, but is not free from the danger of floods. Its trade is chiefly with central and southern America. Founded in 1718 by the French, it still retains its French associations. Galveston is the chief cotton port. Memphis is a cotton and lumber market (hardwoods), with manufactures.

Iron and steel industries are carried on at Birmingham in Alabama, Rome and Atlanta in Georgia, Chattanooga

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in Tennessee. Atlanta is also a great printing and publishing city. Cotton-spinning and weaving are carried on in a number of towns in the Piedmont belt. No large city has developed, but Greensborough and Charlotte (N.C.) and Spartanburg (S.C.) may be mentioned as typical.

The Mississippi. The area drained by the Mississippi is about 1,250,000 square miles in area, so that the river basin is one of the largest in the world. The basin is shaped like an enormous funnel, 1800 miles broad in the north, and all the surplus rainfall upon it has to flow through the narrow spout of the delta. Only a low divide separates the basin from those of the Nelson and St Lawrence, and from those of the Alabama and other streams flowing into the Gulf of Mexico.

The main stream extends from the north-west corner of the basin to the Gulf—a distance of over 4000 miles. The part known as the Missouri is nearly 3000 miles long. The distance between the Missouri-Mississippi confluence and the Ohio confluence is about 200 miles, and from the Ohio to the Gulf about 600 miles. The upper Mississippi brings nearly as much water as the Missouri, so that the volume of water is doubled at their confluence. The Ohio from the north-east adds a still larger quantity. The other principal tributaries—the Yellowstone, Platte, Arkansas, and Red,—all come from the western highlands. As the rainfall of the Missouri basin is less than 10 inches a year, the water-supply comes mainly from the melting snows of the mountains. The river is highest in June. Its steep upper course, through canyons over a series of rapids and falls, gives it great erosive power. Much water, however, is lost by evaporation in crossing the upland plains, so that when it reaches the Mississippi it is overloaded with sediment and very muddy. The same applies to the other western tributaries. The rainfall in the upper Mississippi is 35 inches a year, but the basin is only one-third the area of the Missouri. The volume fluctuates less than that of the Missouri, but it, too, is highest during the

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summer. The Ohio basin, about half the size of the Missouri, has a rainfall of over 40 inches a year, so that it contributes three-quarters as much water as the other two combined. The Monongahela and Alleghany rivers, after a descent of 1000 feet, over a distance of three hundred miles, unite at Pittsburg. Between Pittsburg and Cairo, at the confluence, shoals and rapids alternate. The Ohio fluctuates considerably in volume. Spring rains and melting snows may raise it rapidly 70 feet above its low water-level.

Although the valley of the lower Mississippi is only some six hundred miles long, the river meanders about over the alluvial plain for nearly twice that distance, for the fall from Cairo to the delta is only 6 inches per mile. The plain, twenty-five to a hundred miles wide, is bounded by clay bluffs, rising sharply to two or three hundred feet. A good deal of the valley is below the level of the river banks and even its bed in parts. To keep the river within its main channel, the natural banks built up by deposits from previous floods have to be artificially raised by embankments of earth called levees. Even so the river in flood sometimes breaks through and covers the whole valley from bluff to bluff. In 1927, after heavy rains, there were great floods of this kind, which drove nearly a million people from their homes to take refuge on the levees; and the levees were blown up in places, to save the city of New Orleans by reducing the pressure of water. At such times the tributaries are dried back, and in turn flood their own valleys. Old bends and deserted channels remain as crescent-shaped lakes. At one time or another every portion of the valley has been the river bed.

The delta covers 10,000 square miles, and measures 300 miles from its head to the sea. At New Orleans alluvial deposits are 1000 feet deep, and every year material sufficient to cover a square mile nearly 300 feet deep is deposited. Thus the delta yearly extends farther into the Gulf. About fifteen miles from the sea the river

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breaks into three distributaries, called 'passes,' each of which again subdivides. One is kept open for large vessels by embankments to increase the current, and thus deepen the channel across the bar. The Mississippi and its tributaries are navigable for great distances, but the important part is below St Louis.

NORTH-EASTERN U.S.A.

It will be seen from the list of states that this area, though far smaller than either of the others, contains nearly as large a population as any, and that the value of its manufactures is considerably greater. These were the original English colonies, and they face Europe. The Appalachians being difficult to cross, hemmed in the settlers on the plain and strong, compact states grew up. But once the mountains were conquered, and the gateways to the rich west opened up, the east coast gained added importance. And the mountains themselves proved to contain very rich stores of mineral wealth.

The Appalachian system is a striking example of the geographical influence over man's activities. Stretching from the Gaspé Peninsula to Alabama, a distance of 1600 miles, are three well-marked and apparently distinct groups:

(1) The Mountains of Maine, the Green Mountains, and White Mountains, enclose the valley of the Connecticut. These parallel ridges run north by east, are comparatively high and impenetrable. Their base, composed mainly of ancient crystalline rocks, slopes east and west. They have been scrubbed bare of soil by ice action, leaving granite bosses, known as monadnocks. Morainic deposits, known as drumlins, eskers, etc., are found in nearly all the valleys and plains. The Adirondacks, a triangular knot of mountains, are an outlier of the Laurentian plateau. The river Hudson, a partially drowned valley, marks a break in the system.

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(2) The middle group consists chiefly of the Catskills and the highlands of East Pennsylvania. They are broad and low, and easily crossed, and thus provide the main routes to the interior.

(3) The southern group extends from Pennsylvania to Alabama. This group has three belts. (a) An eastern range of mountains, seventy miles across in North Caro-



FIG. 167. THE WHITE MOUNTAINS, NEW HAMPSHIRE:
NORTHERN APPALACHIANS

Photo E.N.A.

lina, with parallel ridges rising 5000 to 7000 feet, separated by longitudinal valleys. (b) The trough of the Appalachian 'Valley,' thirty to sixty miles wide, itself broken up by low but steep ridges 800 to 1800 feet high. (c) The Alleghany Plateau, in the west, presenting a steep escarpment to the 'Valley,' with a gentle dip slope to the west, carved out into blocks by rivers, as in the Highlands of Scotland.

The whole range is of great age, and has passed through a series of geological changes. The original mountain folds

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were worn down to a plain sloping gently south-eastward, across which the rivers flowed in the same course as at present. Then this peneplain was slowly uplifted to the height of the present ridges, the rivers maintaining their courses. But tributary streams were able to wear out wide valleys in the softer limestones and shales, while maintaining steep-sided channels in the harder sandstones.

The Blue Ridge of the old uplifted Appalachian range on the east forms the main watershed between the Atlantic and the Gulf. It is very old crystalline rock. The Cumber-

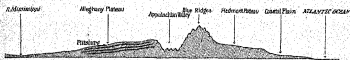


FIG. 168. SECTION ACROSS THE APPALACHIANS, SHOWING VALLEY RIDGES AND ALMOST HORIZONTAL COAL SEAMS

land plateau, on the west, is of Carboniferous age, with rocks very little disturbed. The strata in the 'Valley' are much folded and faulted. The whole range appears to have been uplifted in the south, and submerged in the north, where its eastern side comes close to the coast, forming deep harbours. It retires inland in the south, leaving the Piedmont plateau between it and the coastal plain. The 100 feet contour line may be regarded as the boundary between the plain and the Piedmont plateau. The plain is composed of alluvial and marine deposits, and extends from New York to the Gulf of Mexico. Where the edge of the Piedmont plateau joins the plain of newer rocks the rivers have formed a line of falls, marked by sites of towns, shown on the map. The first settlements were along this line. The Blue Ridge checked advance westward, but the rich valleys enticed the planters, and finally between 1830-40 the Cherokee Indians were bought out. Railways made communications easier, but not till 1880 were the South Appalachians pierced.

The rivers, with the exception of the Hudson, were of

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FIG. 169. FALL LINE SHOWING CHIEF TOWNS

little use for penetrating inland, though the Potomac and Delaware have since been developed. In the north they have practically no lower courses, owing to the submerg-

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ence of the land. South of the Hudson the lower courses are shallow and sandlocked. The upper courses are extraordinarily winding, longitudinal along the soft rocks, and transverse through the hard ridges. The chief east-flowing rivers are the Delaware, Susquehanna, Potomac, and James, all with estuaries and good harbours. The Kanawha, flowing to the Ohio, is the best example of the westward-flowing rivers which have maintained their



FIG. 170. THE MOHAWK VALLEY

Photo E.N.A.

course. The divides between the Tennessee and other rivers flowing south along the 'Valley' are slight. But the most important of all is the Hudson and its tributary the Mohawk, followed by roads, railways, and canals between New York and the Lakes.

The whole range is rich in iron ore, which is but little worked, and the plateau section, in the west, contains most valuable coal, both bituminous and lignite. In the east of Pennsylvania anthracite mines surround Scranton, which has iron industries, and silk manufacture with women workers. More than a third of the total output of United States coal comes from this state. There is also much petroleum and a small output of natural gas. Electricity is available from the Niagara Falls, two hundred

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miles away, and at points along the fall line. It is not to be wondered, therefore, that the manufactures of this region are equal in value to those of the rest of the country. The coal is not buried deep, and it lies undisturbed in thick horizontal beds, some sixteen feet. Limestone is also abundant, so a large number of blast-furnaces are established in Pennsylvania. Pittsburg (700,000) has all

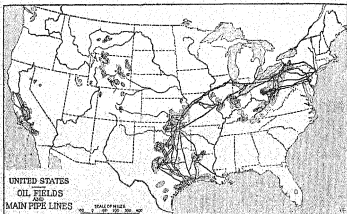


FIG. 171. OIL-FIELDS AND PIPE-LINES

From "Modern Business Geography," by Ellsworth Huntington and Sumner W. Cushing (World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London).

these advantages, and also the valley routes (Monongahela flowing north and the Alleghany flowing south and converging to form the Ohio). At the confluence, the French built Fort Duquesne to keep out the English settlers. Iron and steel articles, large and small, and of every kind, are produced in Pittsburg and neighbouring towns like Newcastle to the north, and McKeesport to the east. The success of pioneer companies in a particular article has led to concentration of specialized forms of manufacture in certain towns; for example, ships at Cleveland, cars at Detroit, cash-registers at Dayton, and

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so on. Pittsburg specializes in steel rails and railway carriages, but it has also important plate-glass and cement industries. Huge firms have controlling interests far and wide, covering every stage of production—raw material, fuel and manufacture, transportation and market.

In Massachusetts and the other New England states are situated more than a third of the cities of the United States with over 75,000 inhabitants. Intensive manufactures are carried on, relying upon the coal and oil of Pennsylvania, water-power, and iron ore from the shores of Lake Superior and Spain, and raw materials, cotton, hides, and wool, all chiefly water-carried. In addition to the manufactures for local needs—for example, gas and electricity plant, sawmills, foundries, furniture, printing, etc.—it is the greatest area for producing cotton, woollen, and leather goods, iron and steel goods of the Birmingham type, such as tools, screws, wire, needles, brassware, etc.

Manchester (N.H.), Providence (R.I.), Fall river, Lowell, and Lawrence (Mass.) all have highly developed cotton manufactures. Lawrence and Providence are the chief woollen towns. Lynn and Brockton lead in the shoe industry, Waterbury in brassware, watches, and clocks. Watches are also made at Waltham. Springfield, Worcester, and Hartford make all kinds of machinery, and Hartford is also a tobacco manufacturing town. Most of these towns are on rivers, providing power and transport. Fall River is a typical town situated near half a mile of falls, and has a splendid harbour.

Outside these clustered towns are others, with saw-mills and paper-mills, and sugar-making from maple syrup is carried on. Portland (Me.) is a great timber port, with special trade with Montreal. Only about one-third of New England is capable of cultivation, but great use is made of this area to provide dairy produce, vegetables, and fruit. Fishing also employs many people. Gloucester, where anchor-making is a special industry, is a fishing centre.

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New Haven is a secondary port, with Yale University near. Boston (781,000) is the chief city of New England. Historically interesting, with the oldest American university (Harvard) as one of its suburbs, it has become the

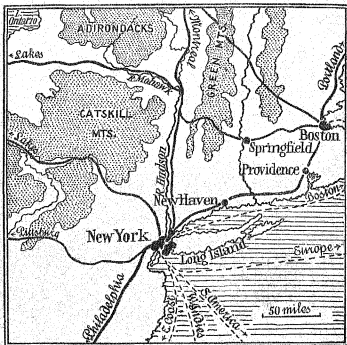


FIG. 172. THE POSITIONS OF NEW YORK AND BOSTON

market and chief port. Railways and steamship routes literally radiate from it. The Hoosac Tunnel gives it direct communication with the Mohawk valley. But gradients remain difficult, and only a small portion of trade in grain and meat from the west goes to it, although the Chicago-Boston-Europe route is nearly two hundred miles shorter than that *via* New York. Sugar from the south

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is sent to Boston for refining, and fruit from Florida for market. Its industries include ready-made clothing and the manufacture of cocoa, coffee, spices, and iron and steel goods.

New York (nearly 7,000,000) is the largest city and rivals London. The outstanding importance of New York is its command of the Hudson-Mohawk route. While the Indians still occupied this fertile valley, Boston remained the chief town. When the Erie Canal in 1825 linked the Mohawk to the Lakes it soon outstripped its rivals, Boston and Philadelphia. The canal can now take 1000-ton barges. Northward, too, by the river Richelieu and Lake Champlain, another route links it to Montreal. Its harbour is ice-free, and anchorage extends for fifteen miles from the mouth of the river. The original city grew up on the long, narrow Manhattan Island, which is still the centre of business. 'Sky-scrapers' have solved the problem created by limited ground space. Railways run to the east by bridge, and to the west by train-ferry, in addition to the northward route. The Erie, the Delaware, and the western railways cross the difficult highland, so that its hinterland includes most of America, and more than half the trade of the United States passes through it. Like London, it is a city of offices, banks, and warehouses, with very varied manufactures, but especially clothing, printing and publishing, iron and steel, and meat-packing; it also has many satellite towns, Newark (leather), Jersey City (sugar and tobacco), Paterson (chief American town for silk), Yonkers, and Hoboken, all of which share in the New York industries.

Albany is the capital of New York state, near the Mohawk gap, on the road and railway routes to the Connecticut valley. Troy (linen goods) marks the tidal limit and the junction of the Erie Canal. Rochester (cameras, etc.), Syracuse (cars, typewriters, and cotton wool), and Schenectady (electrical machines and locomotives), are thriving manufacturing cities along the Erie Canal route.

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Buffalo, on Lake Erie, collects freight, particularly wheat and iron ore, coal, and manufactured goods from Pennsylvania, from the west or from Canada, for despatch to New York by railway, river, or canal. With these raw materials it has iron- and steel-works, wheat and meat products. Both Buffalo and Niagara Falls City benefit from the cheap electric power obtained from the Falls.

On the Boston-New York-Philadelphia railway route stands Trenton, a town of historical interest, with important potteries. Philadelphia (nearly 2,000,000), on the Delaware, the third city to New York and Chicago, was once the capital. It has an excellent harbour, and railway communications with Pennsylvania and the west *via* Altoona, but not so good as New York. It is also 150 miles farther from Europe. Well served with fuel and raw materials and shipping facilities, its manufactures include locomotives on a large scale (one plant can turn out seven a day), textiles, clothing, and carpets. There is also ship-building, and coal is exported.

Baltimore (804,000), on the Chesapeake, compares with Philadelphia as that city does with New York as regards its smaller harbour, difficulty of railway routes, and distance from Europe. Owing to the direction of the estuary, ships to Europe have to travel over three hundred miles more than from New York. It cannot compete on equal terms for the western trade, but its nearer connexion with Pittsburg makes it important for coal export, metallurgical industries, canning of fruit and vegetables, and the manufacture of cotton and woollen goods, clothing and tobacco. Chesapeake Bay is famous for its oyster-beds.

Washington, on the Potomac, is the Federal capital. It stands on Federal territory, seventy square miles in extent, and is not in any state. But it is in a central position among the thirteen original colonies along the coastal plain. The White House (the house of the President), the Capitol, Parliament buildings, the University buildings

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and Government offices make it a beautiful residential city.

Transport. Although six railways cross the Rockies none of them is managed by one company throughout its



FIG. 173. RAILWAYS OF NORTH AMERICA RELATED TO RELIEF

From "Modern Business Geography," by Ellsworth Huntington and Sumner W. Cushing (World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

length from east to west, as in Canada. Most of the trans-continental routes have difficult gradients to negotiate, in both the Appalachians and the West. Most of the traffic is over a section only of the whole route, raw materials being sent to the Middle West, and manufactured goods on the return. Only commodities light in weight but valuable in proportion, like silk, can be sent with profit right across the continent. New York is the chief railway

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focus on the east coast, and San Francisco on the west. Along both coasts important lines run north and south, connecting the towns and ports. Thus: (1) New York is connected with Boston and Portland to the north and through Jersey, Philadelphia, Baltimore, Washington, and Fall Line Cities to New Orleans on the south. (2) San Francisco is linked with Portland and Seattle to the north *via* the Sacramento valley and Salem, and with Los Angeles *via* the coastal plain, and also by the San Joaquin valley.

Between the east coast and longitude 100° W. there is an intricate network of railways, densest near the Great Lakes, and forming 'knots' at Chicago, the world's greatest railway centre, at St Paul, which is a terminus for two routes from the west, at St Louis, Kansas City, Cincinnati, and other centres. The chief transcontinental connexions are as follows:

From New York (New York Central) *via* the Hudson-Mohawk valleys, Buffalo, Cleveland, Chicago (980 miles).

From Chicago: (1) (Union Pacific) *via* Omaha, Cheyenne, Evans Pass (over 8000 feet) to Ogden, either (a) across Great Salt Lake to the Humboldt valley, and by the Central Pacific to Sacramento and San Francisco (2350 miles); or (b) northward to the Snake valley and Portland; or (c) to Butte and the Columbia valley for Tacoma and Seattle.

(2) *Via* St Paul and the Great Northern Railway route, parallel to the Canadian frontier, to Tacoma and Puget Sound.

(3) *Via* St Paul and North Pacific, Bismarck, the Yellowstone river to Helena, and Spokane for Portland or Seattle (1823 miles).

From St Louis *via* Kansas City, Topeka, through New Mexico, Santa Fé, and Arizona, to the San Joaquin valley for San Francisco (2395 miles).

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From New Orleans *via* the Southern Pacific route, past Galveston, to the river Rio Grande, which it follows closely in places through Texas to El Paso, down the Gila valley, across the Colorado to Los Angeles and San Francisco (2489 miles).

Most of these routes have connexions running north to south along the east of the Rockies from Cheyenne to Denver, Pueblo, and Santa Fé.

The most important canals have already been mentioned—viz., the canals linking the Great Lakes to the St Lawrence, the Erie Canal between Lake Erie at Buffalo to Hudson and Troy, the Champlain Canal joining the Erie Canal to the Lake and the St Lawrence, and the Mississippi Canal joining Chicago and Lake Michigan to the river Mississippi. Another valuable canal is that through Cape Cod, which shortens the New York-Boston route by sixty miles.

But the rivers themselves are of great possible value as highways. It is estimated that there are 20,000 miles of navigable rivers, including nearly 14,000 in the Mississippi basin. The Missouri itself is a navigable river for 2000 miles, right to the Great Falls at the gate of the Rockies. The freight carried on the Ohio is enormous. The Cumberland, the Tennessee, the Arkansas, the Red river, the Columbia, and the Snake on the west coast are all navigable. The cheapness of this transport is remarkable; for example, coal has been sent from Pittsburg to New Orleans (2000 miles) at a cost of 2s. 6d. per ton. But on the whole the importance of river transport tends to diminish in favour of road and railway transport, except for heavy or bulky goods.

Time. North America has five time-belts: Atlantic time, based on longitude 60° W.; Eastern time, based on longitude 75° W.; Central time, based on longitude 90° W.; Mountain time, based on longitude 105° W.; Pacific time, based on longitude 120° W.

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As the world rotates once every 24 hours, the sun seems to travel 15° in 1 hour ($\frac{1}{24} \times 360^{\circ}$), or 1° in 4 minutes. Time is based on the sun. Local time is fixed by its

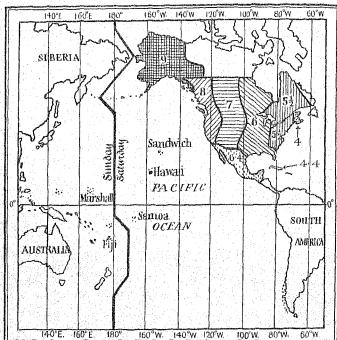


FIG. 174. INTERNATIONAL DATE LINE AND TIME BELTS IN NORTH AMERICA

midday. But local time everywhere is inconvenient for trains and telegrams, for obvious reasons. So all towns within a particular zone—for example, between longitude 75° W. and 90° W.—take the time of that zone. Passengers travelling west must put watches back one hour at the frontier station of each zone; travelling east they advance their time one hour.

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When it is noon at Greenwich it is 7.0 A.M. at New York, 6 A.M. at St Louis, 5 A.M. at Denver, 4 A.M. at San Francisco. So that a telegram dispatched at 3 P.M. from New

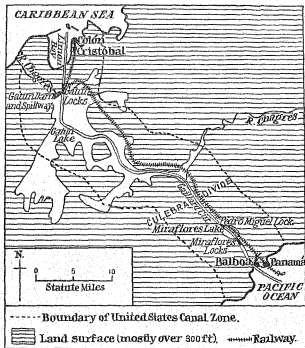


FIG. 175. THE PANAMA CANAL.

York reaches San Francisco about noon, apparently three hours before it was sent!

The Panama Canal. A belt of Central America, ten miles wide, through which the Canal is cut, is United States territory, and is called the Canal Zone. The construction of this canal was no less a triumph for the scientist than for the engineer. Malaria and yellow fever took a heavy

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toll of life at the first French attempt 50 years ago. The discovery that these diseases are carried by mos-

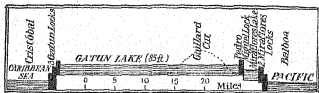


FIG. 176. SECTION ALONG THE PANAMA CANAL.

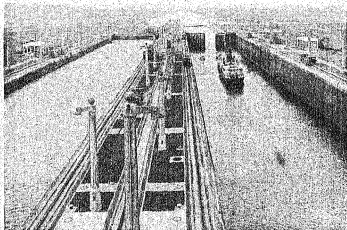


FIG. 177. THE PANAMA CANAL: SHIP PASSING THROUGH THE GATUN LOCKS

Photo E.N.A.

quitoes enabled the Americans to attack the source of the disease, and so allow men to work at the canal. The canal is 50 miles long, 300 feet wide, and has a minimum
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depth of 41 feet. The passage takes 7 to 8 hours. Locks at each end can lift the largest ocean vessels to the canal, 85 feet above sea-level. It is open to all countries on equal terms. But the canal benefits the United States more than any other country. The number of American vessels which pass through the Canal every year is nearly twice that of British vessels. It places America midway between the great commercial centres of Europe and the populous markets of Asia. It unites the east and west coast far better than the railways; it brings South America into closer relationship with North America, reduces prices, and stimulates trade. It is also of great strategic value. But unlike the Suez Canal, it does not shorten the voyage from Europe to Australia. The Suez Canal shortened all voyages between the western countries (including eastern America) and the Far East. But New York is no nearer Shanghai *via* Panama than London is *via* Suez.

Approximate distances saved by the Panama Canal are as follows:

	YOKO- HAMA	MANILA	HONG- KONG	VAL- PARAISO	WELLING- TON	SYDNEY
<i>From Liverpool</i>						
<i>Via Suez</i>	11,500	9,600	9,700	8,700	12,500	12,800
<i>Via Panama</i>	12,300	14,100	13,800	7,300	11,100	12,400
Saving	No saving	No saving	No saving	1,500	1,400	No saving
<i>From New York</i>						
<i>Via Suez</i>	13,100	11,500	11,600	8,400*	11,300*	13,400
<i>Via Panama</i>	9,700	11,400	11,700	4,600	8,500	9,700
Saving	3,400	200	No saving	3,800	2,800	3,700

* = *via* Strait of Magellan.

ALASKA

The Territory of Alaska was purchased from Russia in 1867. It consists of a mountainous region, the plateau drained by the Yukon, the Rockies, and an Arctic coastal plain. It is about a sixth of the area of the United States.

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The west coast gets abundant rain, and is forested, but continuous frost lasts for nine months in the Yukon basin. Salmon-fishing and mining are the most valuable industries. Gold, silver, copper, and coal are found. Juneau is a gold-mining town of nearly 4000 persons. The population is increased in summer by labour to work the mines, railways, and canneries. The chief route is from Skagway by railway to White Horse in Canada, by river to Dawson and Fort Yukon, and so into Alaska. Eskimos and Indians are developing the rearing of reindeer introduced from Lapland.

THE HAWAIIAN ISLANDS

The Hawaiian Islands, another outlying Territory of the United States, are described on pages 606-609.

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CHAPTER XXVI

MEXICO, CENTRAL AMERICA, AND THE WEST INDIES

MEXICO

THE Republic of Mexico occupies the southernmost plateau of the Cordillera contained between east and west Sierra Madre, which both rise and converge southward. The coastal lowlands are narrow or absent. The western Sierras are higher and rise more steeply than the eastern. The northern part of the plateau is a region of inland drainage, like the Great Basin, and forms a barrier between Mexico and the United States. Most of it is covered with grey sage brush, cacti, and agave. Three-quarters of the population (about 16,000,000) live on the south of the plateau, where the average height is 6000 to 7000 feet.

The highest peaks of the Sierras are volcanic cones. The snowclad summits of Orizaba (18,240 feet), in the east, and Popocatepetl (17,881 feet) are of striking beauty. Some of these volcanoes are still active, notably Colima, and earthquakes are common. Separated from the plateau by the narrow isthmus of Tehuantepec is the low limestone peninsula of Yucatan (*cf.* Florida).

Crossed by the Tropic of Cancer, Mexico has the sun overhead in summer. It is in the latitude of the Sahara, and therefore its climate is controlled by the influence of the north-east Trades. These are normally dry winds, because they are moving toward warmer regions, but they bring abundant rain to the south-east of Mexico, owing to the influence of the Gulf of Mexico and the steep ascent of the plateau. But being narrow the plateau, although dry, is only semi-desert even in the north. The east coast

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is hot in both winter and summer, with seventy inches of rainfall. The west coast is quite as hot, but has only half the rainfall. The wettest months are May to June, October to November. The fall in temperature on ascent to the plateau is very marked—Mexico City is 17° F. cooler than Vera Cruz, and has less than half the rainfall.

On the hot coastal plains logwood and other dyewoods, mahogany, cedar, rubber, and cacao-trees grow where soil is moist. On the drier parts, particularly in the north, is savanna-land. Sugar-cane, vanilla, and tobacco, tropical fruits, bananas, and pineapples are cultivated. This hot belt extends to an altitude of 3000 feet.

At altitudes between 3000 and 6000 feet it is more temperate, and the crops of more northerly latitudes, cotton, maize, and coffee are found. The valleys in the east are clad with broad-leaved evergreen forests, and the ridges with conifers. But on the drier west savanna-land is more common.

The higher parts of the plateau and the sierras are above 6000 feet, and the Mexicans speak of this as the cool belt. Although rainfall is light, plenty of water descends from the mountains, and extensive pastures give rise to cattle ranches. In the moister valleys are woodlands of tall trees, mixed deciduous and coniferous. The agave is cultivated for the juice, from which the national drink is made. With the help of irrigation, wheat, maize, and cotton are grown. On the Yucatan peninsula a species of the agave is extensively cultivated for the sisal hemp obtained from the fibres of its leaves.

With its varied climate, Mexico could grow almost any crop, from rice and oil-palm to oats and potatoes. But the climate, unstable political conditions, and the lack of education have made the people unprogressive, and sugar is the only crop of which there is a surplus for export. But the chief wealth of Mexico lies in its minerals contained in the volcanic rock. It leads the world in the production of silver, for which it has been famous for

MEXICO

centuries. It is mined in every state, but the northern area is more important than the others. Lead, copper, gold, and zinc are also mined and exported. Some coal, insufficient for home needs, is mined near the Rio Grande. Lack of coal is compensated for by plentiful petroleum. It is used for fuel in the factories, tramways, and railways and for lighting. The oilfields are controlled by foreigners, and the Mexican Government gets its chief revenue from taxes on the industry, while bandits also extract large payments under threats of violence. At present, most of the oil comes from the Tampico district. But the production has fallen to about 25,000,000 barrels, which is about 3 per cent. of the world's annual output.

Besides mining and agriculture, the occupations are chiefly ranching and manufacturing. Extensive grazing-lands in the north, along the west, and elsewhere, pasture large numbers of cattle, sheep, and goats. Horse- and mule-breeding is important for transport demands. Meat, hides, and wool supply home needs in the leather and textile industries, and are exported. Straw-plaiting is another industry.

Mexico City (about 968,000), the capital, stands in the centre of the Anahuac plateau on the south. Round it are many evidences of the irrigation works of the Aztec civilization which the Spaniards destroyed. Well served by three railways to the United States and others to the coast, Mexico City is an important market and manufactures saddlery, silver-work, cigars, and hats.

Vera Cruz has for centuries been the chief seaport. Its climate is not to be compared with Mexico City for comfort, and it is not surprising that the population is only 55,000. Its harbour is poor, but in spite of this, owing to its position on the east coast and a better railway service, it retains most of the trade, particularly for imports, which consist mainly of cotton goods, machinery, and iron and steel goods.

The line connecting Mexico and Vera Cruz through

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Puebla, with its textile, paper, and leather manufactures, was constructed with great difficulty only within the last half-century. The railway routes to the north run respectively (1) *via* Guadalajara, a beautiful town in a rich agricultural and mining district, along the coastal plain through Guaymas, a port with a good harbour; (2) through the centre of the plateau and the ranching towns; and (3) *via* San Luis Potosí, famous for silver and copper, and Monterey, a mining centre connected by railway with Tampico.

Of the routes across Central America (excepting Panama) the isthmus of Tehuantepec is the easiest and narrowest, being only 125 miles, which is crossed by a railway climbing not more than 730 feet.

The west coast has a much more healthy climate than the east. It is a high, rocky coast, and has some splendid natural harbours, particularly at Acapulco. Mazatlan, near the entrance to the Gulf of California, has fertile lowlands stretching away to the north. Guaymas also has a good harbour. A railway runs through Mazatlan and Guaymas to the United States.

CENTRAL AMERICA

The republics of Guatemala, Honduras, Salvador, Nicaragua, Costa Rica, and Panama, together with British Honduras, all lie well within the tropics, so that the sun is always high in the sky, and overhead twice a year. The temperature remains high, about 80° F. throughout the year, with greater range between day and night—90° F. to 70° F.—than between the seasons. Lofty mountains, with volcanoes, attain heights of from 10,000 to 13,000 feet, and lying across the track of the prevailing trade-winds produce heavy rains, especially in early summer. Thunderstorms and hurricanes are frequent.

The whole isthmus is "much more a barrier between oceans than a link between continents." Routes across

CENTRAL AMERICA

are few, but gain thereby in importance. Before the Panama Canal was constructed, it was cheaper to ship goods to this coast, unload, and send by train, and reship the other side, than to send by train across the United

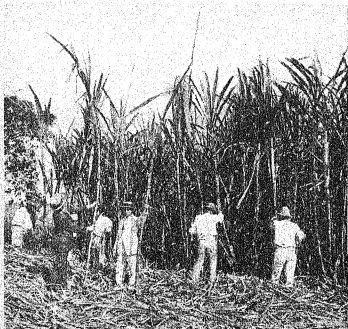


FIG. 178. CUTTING SUGAR-CANE
By courtesy of the "Manchester Guardian Commercial"

States. A railway crosses the narrow part (180 miles) of Guatemala. In Nicaragua the isthmus is 150 miles wide. Lakes Managua and Nicaragua fill a low-lying depression, and are joined to the Atlantic by the San Juan river. This route was surveyed for a canal. But active volcanoes on islands of the lake were a serious objection. The route can be followed by steamer to Granada and by train to

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Corinto. Between Limon and Punta Arenas in Costa Rica is another railway. But most travel in these republics is by sea.

Thus disunited, and having no coal, agriculture and forest products play the chief part in the economic life of this part of the world. Sugar-cane, cacao, and coconuts



FIG. 179. BAMBOO-TREES

By courtesy of the West India Committee

are the most important for home consumption, and coffee and bananas, a highly organized business worked with negro labour, for export.

The forests provide valuable timber for cabinet-making, chiefly mahogany and cedar. Dyewoods are not as valuable as they were before artificial dyes were discovered. Rubber- and pine-trees are also present. Guatemala (121,000), situated on the plateau, is the largest town in the isthmus. Salvador is the most densely populated, and

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British Honduras the most sparsely populated state. Cultivation of coffee and fruits in the former is well managed, while the latter finds it necessary to import food, as forestry claims more attention. Belize is the chief mahogany port. The population of Honduras is also very thin and scattered, and the capital, Tegucigalpa, has no railway connexion. The most fertile part of Nicaragua is the volcanic area. In the state of Costa Rica there is a considerable white population, unlike the other states, where Indians and half-breeds prevail. This white population lives mainly in San José, the capital, and other towns, all situated on the plateau at an altitude of about 4000 feet. The plateau is an important coffee-growing area.

The peasant industries consist of straw-plaiting, silver work, coconut-shell carving, bamboo work, and pottery (sun-dried). Most of the houses are built of sun-dried mud (adobe). Cigar-making is universally practised.

THE WEST INDIES

The West Indies are closely related to Central America by structure and in their climate and productions. In Haiti three distinct mountain ranges, 8000 to 10,000 feet, run parallel, east and west. The Sierra Maestra, in Cuba, is a continuation of the central ridge of these three; and the Blue Mountains of Jamaica a continuation of the southern one. In Porto Rico is the knot into which the three ridges are united. This group of mountainous islands forms the Greater Antilles, and are the remains of an old folded mountain range, traces of which are found also in Honduras. The outer islands of the Lesser Antilles are also the tops of a drowned range, many being volcanic peaks, marking a line of folding and submergence. Disastrous volcanic eruptions from Mont Pelé and La Soufrière, in Martinique and St Vincent, and earthquakes have occurred within the last thirty years. The Bahamas are

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a collection of coral islands, similar to the 'keys' off Florida. Trinidad is an outlier of the mountains of Venezuela. The total area of the West Indies exceeds that of England and Scotland. Cuba is larger than Ireland, and Jamaica about half the size of Wales.

Cuba. The western part of Cuba is a limestone highland.

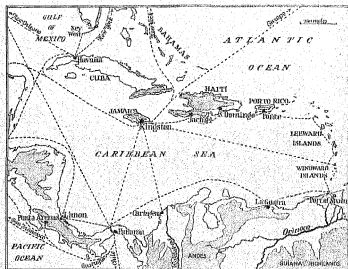


FIG. 180. THE WEST INDIES

On the southern slopes are the tobacco plantations. The Sierra Maestra is rich in iron. Copper, manganese, and asphalt are also found. Cuba leads the world in the production of cane-sugar and tobacco is a staple product. Coffee and fruits (bananas, pineapples, and citrus fruits) are also important crops. Maize and potatoes are widely grown for home use. The eastern part being the wettest, has considerable forests of mahogany, palms, dyewoods, cedars, and pines. The royal palm is useful for its seeds and fibres, its leaves and trunk. In the clearings are the

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coffee plantations. The population numbers about three and a half millions, mostly coloured.

Havana (581,000) is the largest city of the island and stands on one of several fine harbours. It is in every sense the capital, exporting its famous cigars (in boxes made of



FIG. 181. GROWING BANANAS

Photo E. Wells Elliott, by courtesy of the West India Committee

cedar-wood) and the produce of the whole island. There are over 3000 miles of railways running through the centre of the island and the tobacco and sugar regions. Santiago, on the south-east coast, has a good harbour.

Haiti is divided into two republics, Haiti, on the west, and the Dominican Republic, on the east. French is spoken in one and Spanish in the other. The mountainous character of the island restricts settlement and cultivation. Cacao and coffee are grown in both parts, bananas and

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tobacco in the east, cotton, sugar, and logwood in the west. Port au Prince (100,000) and Santo Domingo (31,000) are the capitals and ports. Porto Rico, a United States possession, produces chiefly sugar and coffee, but also fruits (grape-fruit, oranges, and pineapples), tobacco, cotton,



FIG. 182. A GINGER PLANT

By courtesy of the West India Committee

and nuts. Most of the trade is with the United States, through San Juan, the capital, on the north coast.

Jamaica (British) is, like the other islands, hot on the fertile lowlands, cool on the limestone mountains. Fruits, especially bananas, sugar, and coffee on the slopes of the Blue Mountains in the east, cacao, coconuts, and spices (ginger, etc.), all contribute to an important export trade, most of which goes to the United States. Palms grow luxuriantly, also dyewoods, mahogany, and ebony. Kingston (63,000), on the south-east, is the port and capital.

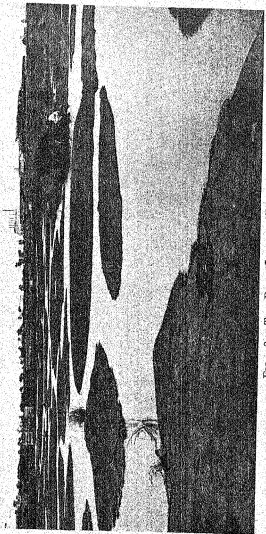


FIG. 183. THE FITCH LAKE AT TRINIDAD

By courtesy of H. O. Thomas, Esq., and Messrs T. and J. Harrison, Billiard Street, E.C.

THE COUNTRIES OF THE WORLD

The Lesser Antilles. The Virgin Islands, St Thomas and St Croix (both American), are important for their position at the crossing-place of the route to the Panama Canal and that between North and South America. Most of the other islands of this group are British, but Guadeloupe,

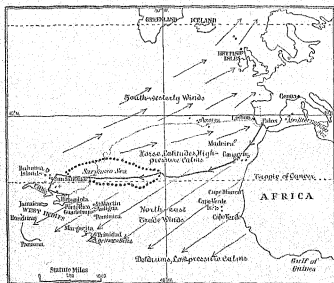


FIG. 184. THE FIRST VOYAGE OF COLUMBUS, 1492-93

Martinique, and a few other small islands are French. All these islands produce sugar and fruits, and some specialize; *e.g.*, limes at Montserrat, pineapples at Antigua, and oranges at Curaçoa, which is a Dutch possession.

Trinidad and Tobago contain valuable forests, including coconut-palms. The famous asphalt lake of Trinidad constantly replenishes itself. Petroleum is also found. Port of Spain, under the lee of the mountains in the north-west of Trinidad, is linked by railways to the sugar and cacao plantations.

THE WEST INDIES

Barbados is the most densely populated. Its climate is similar to that of Trinidad, with heavy rain in the second half of the year. Bridgetown, the capital, is also the port. Sugar is still the main crop, but 'sea island' cotton is also grown for export, in addition to maize and other crops for home needs.

The Bahamas. In the Bahamas (and the Turks and Caicos Islands, which are administered with Jamaica) evaporation of sea-water for salt is an industry. Fruit and early vegetables are grown for the American market, as well as sisal hemp. Sponge-fishing is also carried on. Columbus is thought to have met land at Watling Island, one of the group. Nassau is the commercial centre and port.

In general, bananas compete very strongly with sugar cultivation. But the banana trade needs organization of a high order. The fruit must be carefully picked, and needs refrigerators and special ships. These are available in Jamaica, but not, for instance, in Barbados. Sugar in most cases includes its by-products—rum and molasses.

PART IV

THE SOUTHERN CONTINENTS

CHAPTER XXVII

COMPARATIVE FEATURES

THE position of these continents in relation to the equator results in many similarities of climate and productions. But the distribution of mountains, plains, and plateaux, and the breadth of land play an equally important part in the regions to be considered.

The equator cuts South America in the north, roughly bisects Africa, and passes 700 to 800 miles to the north of Australia. The widest part of South America lies south of it; of Africa north of it. America extends farthest south to latitude 54° (*cf.* latitude of the north coast of Germany); Australia reaches 39° S. and Africa 35° S. On the other hand, South America extends only 12° to the north of the equator, while Africa reaches 38° N. The north of Australia, as we have seen, is eleven degrees south of the equator. Thus South Africa is nearer the equator than any part of Europe, and so is most of Australia, while South America has the greatest range of latitude—viz., sixty-six degrees.

In area Africa is nearly four times as large as Australia and about one and a half times as large as South America. Not only is this so, but its greatest width nearly equals its length, 5000 miles, and this vast area is mostly high above sea-level (average height 2130 feet). Further, its coastline is short in comparison with its area, being only 19,000 miles, which is but little more than that of South America and one and a half times that of Australia. Thus the

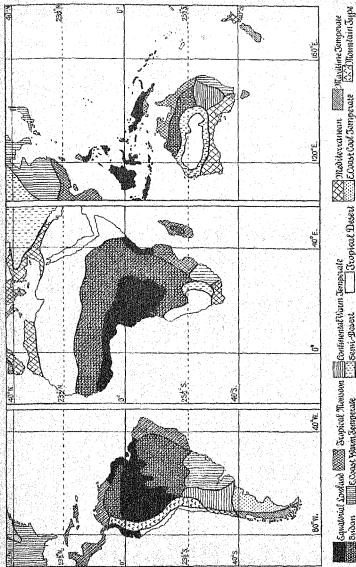


FIG. 185. CLIMATIC REGIONS AND COMPARATIVE LATITUDES OF THE SOUTHERN CONTINENTS

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average distance from the sea is over 400 miles in Africa, about 200 miles in Australia, and 350 miles in America. Africa, therefore, with its height and short coast-line, is much less influenced by adjacent oceans than either of the other two continents.

Most of Africa lies between the tropics, and Africa is the only continent cut by both tropics. Australia has the smallest tropical area, and the position of the Tropic of Capricorn over it should be compared with that of the Tropic of Cancer over Africa.

As every one knows, the sun is overhead at the southern tropic on December 21, at the northern tropic on June 21, and between these dates the latitude of vertical sun moves slowly northward, crossing the equator on March 21, and again on its southward journey between June and December on September 22. Equally well known is the fact that the full effect of the sun upon a land surface is not felt till a month later. So that the belt of greatest heat swings slowly southward and northward, following the sun, but lagging behind it, and it swings farther north in our summer than it does southward in winter, owing to the larger land areas north of the equator.

Similarly, the wind and rain belts shift in harmony with the temperature belt. Owing to this crossing and re-crossing of the equator by the sun and by the wind and rain belts, the seasons are less marked between the tropics than they are outside them. Rain rather than temperature is the distinguishing feature. The rainy season which follows the northward progress of the sun is longer, and the rain is heavier than that following its southward journey. During the northern summer there is very little rain south of the equator in Africa. The general effect as regards rainfall so far as the southern continents are concerned is given on page 445.

The Equatorial, Hot, Wet Lands. The Amazon lowland is the typical region: always hot (about 80° F.) and always wet, although two seasons are wetter than the others. The

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SEASONAL RAINFALL

WESTERN AREAS OF CONTINENTS

EASTERN AREAS OF CONTINENTS

40° N. ————— 40° N.

Mediterranean Climate
Winter rains—Drought in summer.
[North African coast.]

Not applicable to southern
continents
[But China has summer rains and
a fairly dry winter. Monsoon
climate.]

23½° N. ————— Desert: rain rare ————— 23½° N.
[Sahara]

A very wet season (June to September), beginning soon
after the sun becomes vertical. The rest of the year very
dry.

[The Sudan. Highlands of Guiana.]

0° ————— Rain at all seasons. { Two seasons very wet (March to May)
Oct. to Dec. } 0°
The other two seasons only less so.

[The Amazon basin, the Congo basin, and the East Indies.]

A wet season (October to December). Dry the rest of the year.
[S. Brazil, Tanganyika Territory, Rhodesia, and N. Australia.]

23½° S. ————— Desert: rain rare ————— 23½° S.
[Atacama, Kalahari, and Australian.]

Mediterranean Climate
Winter rains; dry summers
[Central Chile, S.W. Cape
Province, and S. W. Australia.]

Summer rain: winter fairly dry
[N.E. Argentina and Uruguay,
S.E. Africa (Durban), and New
South Wales.]

40° S. ————— 40° S.

Rain at all seasons; most in
winter (July)
[S. Chile and New Zealand.]

Rain at all seasons; most in
summer
[S. Argentina. No region in
Africa or Australia.]

constant supply of rain clothes it with dense evergreen
forest; palms, rubber, cacao, and other trees are so
crowded and roped together with lianas as to be almost

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impenetrable. Rivers are the highways. In clearings rice and sugar crops mature at any season. In Africa the Congo basin is a similar region, but, owing to highlands and varying soils, there are areas of tall, tropical grassland. Palm oil, copra, and ivory are products additional to rubber and cacao. In the East Indies the presence of mountains varies the character of the forest. Here cane-sugar, tea, and coffee are cultivated in the clearings. As a rule, the forest natives are primitive hunters, disinclined to regular work and uninterested in the outside world. The white man has to organize any production, and this has been done sometimes by cruel methods.

The Sudan and Similar Regions. To the north and south of the hot, wet lands conditions change gradually, trees thinning out and grasslands occupying more and more of the area. These in turn become thinner and gradually pass into the deserts lying along the tropics. The Sudan is a belt, about 300 miles wide from north to south, which extends from Senegal to the upper Nile. Similar country extends southward over the high region of the great lakes to link with a savanna belt in the south, covering the Zambesi basin to the Atlantic coast. In South America the *campos* of Brazil and the *llanos* of the Orinoco are similar regions. In Australia the savanna land is a belt curving roughly parallel to the north coast, widest in Queensland, where it reaches to latitude 25° S. Most of the isolated trees are deciduous. The most important are the large baobab and the tamarind in Africa, the evergreen eucalyptus in Australia, while the prickly acacia and the water-storing bombax are found in all three continents. Thornwoods are characteristic features.

Savanna land is covered with grass, interspersed with clumps of trees. It differs from steppe in that there is no severe snowy winter. The most active period of growth is that following the rainy season, when the grasses quickly smother most of the tree seedlings. Some of the grasses grow to a great height, forming cover for big game. The

THE SOUTHERN CONTINENTS

giraffe, suited in so many ways to its habitat, elephants, antelopes, and zebras graze in herds over these lands, and form the prey of lions, hyenas, leopards, and jackals. On the desert margins are found the big running birds, the ostrich in Africa, the rhea in South America, and the emu of Australia.

The savanna lands of Africa carry the largest population. Tribes like the Fulas of the North, the Masai of East Africa, and the Zulus tend herds of cattle and sheep, and lead nomadic lives like the steppe-dwellers. Bamboo



FIG. 186. HERD OF ELEPHANT IN THE SUDAN

huts with coverings of hide, hide shields, grass mats, and clothing made of skins of animals all reflect their environment and mode of life. Nearer the forests agriculture becomes the chief occupation. Crops of millet (*durra*), maize and wheat, cotton and indigo, kola and ground nuts, and yams (similar to potatoes) are easily grown. The Hausas of Nigeria are agricultural tribes of splendid physique. In their settlements, surrounded by thick, dull-red, mud walls, cotton is woven by hand, and artistic work is done in leather and pottery. Towns like Kano also form convenient markets for traffic from the deserts to the north, and the tropical forests to the south.

The Monsoon Lands. On the eastern margins of the continents near the tropics winds vary with the season, flowing outward from the land in the dry winter and

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inward in the wet summer. India and China are the most familiar monsoon countries. But the north-east coast of Australia, the east coasts of South America, Africa, and Madagascar between latitudes 10° and 25° S., experience climate of this type, with heavy summer rains. A modified form of monsoon occurs also along the Guinea coast. These areas are heavily forested with hardwood trees and palms, and where cultivated yield rich crops of rice, sugar, and cotton. Many of them are very densely populated and highly civilized.

The Hot, Dry Regions. The desert areas are found on the west of the continents, in the region of the Tropics of Cancer and Capricorn, owing to the lack of on shore winds. Clear, cloudless skies lead to intense heating by day and rapid cooling, by radiation, after sundown. The rapid changes of temperature break up the land surface unprotected by vegetation, and strong winds carry the process farther, producing great sandy wastes. Where basins occur in the rock strata, the small supply of water from occasional but violent thunderstorms is retained, and man uses it by sinking wells.

Africa has two such desert areas, the great Sahara in the north and the Kalahari in the south. The other two continents have nothing to compare with the Sahara north of the equator, but the West Australian Desert and the Atacama Desert of South America are found in the same latitudes as the Kalahari.

While the numerous oases of the Sahara support considerable population, part of which is settled in the oases, where date-palms and crops of millet and cotton are grown, and the other part nomadic, pasturing camels and horses, the southern deserts afford little support for life. Hottentots and Bushmen struggle for existence on the Kalahari, but in America and Australia only the presence of valuable deposits of nitrates and gold respectively attract white people there. Both water and food have to be brought to them to make life possible.

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Warm Temperate Areas. (a) The climate and vegetation of the Mediterranean regions as found in Central Chile, South-west Africa, South-west Australia, and Victoria have already been dealt with (see page 308). The North Island of New Zealand may also be included in this group. (b) North-east Argentina and Uruguay, South-east Africa (Natal), and New South Wales receive most of their rain in the summer. Unlike the monsoon countries, their winters are not entirely dry, and are mild. (c) The interior areas of these latitudes, North Argentina, the high veld of south-east Africa, and interior of New South Wales and South Australia, experience a greater difference between summer and winter than the coastal areas, and only a light rainfall (rarely more than 20 inches), and this falls in the summer, when pressure is low.

Cool Temperate Areas. (a) Western areas: South Chile, Tasmania, and the South Island of New Zealand all lie in the belt of prevailing westerly winds, and have moderate, equable temperatures and adequate rainfall throughout the year. Here conditions are similar as regards plant, animal, and human life to those in our own country. (b) South Argentina, lying to the east of the Andes, has much less rainfall, partly owing to dry, warm, descending winds, so that a large part is semi-desert. As a consequence the natural forests of the western area just mentioned are replaced by dry steppe land. The natural grassland of the pampas has been developed into ranching and wheat-growing areas, and the large rolling plain has favoured the construction of good railways.

CHAPTER XXVIII

SOUTH AMERICA

THE *Cordilleras* of the Andes fall naturally into two divisions, the northern half forming a great arc and the southern half, from about latitude 18° S., running north-

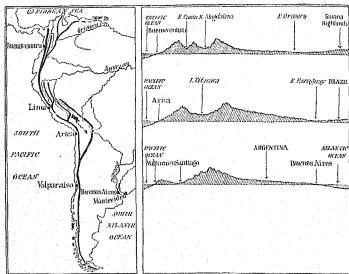


FIG. 187. THE MAIN FOLDS OF THE ANDES AND TYPICAL CROSS-SECTIONS

south in a straight line until they curve eastward in Tierra del Fuego.

Between latitudes 50° S. and 26° S. the system consists of a low coastal range and a lofty main range, separated by an important longitudinal valley. South of latitude 45°

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41° S. this valley is flooded, and the coast is characterized by islands, inlets, and landlocked channels. North of latitude 41° S. the valley has been filled by deposits of newer rocks, forming the fertile valley of Chile. The Andes are at their highest in this section, with the extinct volcano Aconcagua (22,863 feet) towering above the Uspallata Pass (12,800 feet).

To the north the coastal heights and longitudinal valley of Chile become lost in the Atacama Desert. The main chain divides, enclosing the Bolivian plateau, which is a desert in the south, but becomes more fertile nearer the tropic. The Bolivian plateau averages 12,000 feet, with Sorota (21,490 feet), Illimani (21,030 feet), and other peaks rising high above it. Lake Titicaca is the highest great lake in the world, and is a diminishing remnant of its former self.

From Iquique the main chain dominates the Pacific coast, and this is accompanied by a lowering of the average height and the absence of volcanoes. But earthquakes are more frequent, especially round Arequipa and Arica.

The Bolivian plateau is continued into Peru in a modified form. The ranges again come close together. As distinguished from the Bolivian plateau, Peru is well drained to both the Pacific and the Amazon. It is probable that the headwaters of the Amazon have drained lakes similar to Titicaca.

The Gulf of Guayaquil marks a partial break in the chain. The Equatorial Andes run hence as far as the knot of Pasto in two chains, and volcanoes reappear, notably Cotopaxi (19,612 feet) in the eastern chain and Chimborazo (20,498 feet) in the west. The plateau of Ecuador, 9000 feet high and 50 miles broad, is curiously drained. Both Pacific and Amazonian rivers have cut back into the crests of the east and west sierras, and are racing to capture the drainage.

In Colombia the system is again broken up into several ranges or sierras. On the west the coastal range is

THE COUNTRIES OF THE WORLD

separated from the western Cordillera by the depression of the San Juan-Atrato valleys, leading to the Gulf of Darien. In the east Bogotá stands on a plateau 8000 feet high, drained by a single river. To the north the eastern range forks; one section, Sierra Merida, runs south of the Gulf of Maracaibo, and ends in Southern Trinidad. This range

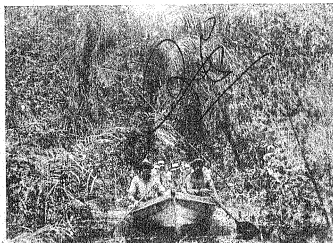


FIG. 188. A BOAT IN THE FOREST

Photo Booth Line

forms the northern watershed of the Orinoco. The other runs farther to the north, and turning east runs along the Caribbean Sea, forming capes and the Leeward Islands, appearing finally in the north of the island of Trinidad.

The Great Lowlands. The vast basin of the Amazon is half the size of Europe and twice that of the Congo basin. It is so level that fair-sized vessels can ascend to the foot of the Andes, 2000 miles from its mouth, and the influence of the tide is felt above the Tapajoz confluence. The watershed between the Amazon and the Orinoco in the north and Parana to the south is so low that flood-water

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flows sometimes to the one and sometimes to the other. As the Amazon flows due east almost along the equator and its basin is open to the sea, the climate and vegetation is almost uniform over the whole area. The Madeira (over 3000 miles) is its longest tributary. The most important left-bank tributary is the Rio Negro, which joins the Amazon above the Madeira confluence. The Cassiquiare, a tributary of the Negro, is joined also to the main stream of the Orinoco. The equatorial rains, which put the southern tributaries in flood in the southern summer and the northern tributaries in flood in the northern summer, keep the Amazon always full. So large is the volume of fresh water it delivers to the ocean that its influence can be traced over a hundred miles out to sea. The Para channel, to the south of Marajo Island, is the one used by ships. Note that the Tocantins joins the estuary, and is not strictly a tributary of the Amazon.

The Orinoco rises in the Sierra Parima. Curving northward round the foot of the highlands, it is fed by slow, navigable tributaries from the Cordilleran spurs in Colombia and Venezuela on its left bank, and swift-flowing tributaries from the Guiana highlands on its right bank. Its lower course is due east to its delta, opposite Trinidad. Its middle course forms the boundary between Venezuela and Colombia. And in this part near Atures there are rapids, which form the limit of navigation. Its delta is as large as Wales. While the upper course is heavily forested, its middle and lower course lies through the grassy *llanos* to the mangrove swamps along the coast. The effect of the tide is felt two hundred miles upstream at its port of Bolivar.

The Rio de la Plata estuary is formed by the Parana-Paraguay river and the Uruguay. The basins of the Paraguay (2000 miles long), the Parana (1500 miles), and the Uruguay drain one-fifth of the area of the continent. Like the Amazon, the fall is gentle, and both the main rivers and their tributaries are navigable for long distances.

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Unlike the Amazon, the general direction is north-south, so that climate and vegetation vary with latitude. South of the Rio de la Plata the lowlands are continued, being crossed by large rivers like the Rio Grande and Rio Negro, draining the eastern flanks of the Andes.

The Eastern Highlands. These are tilted tablelands of unfolded strata which have been deeply carved out by rivers. They are remnants of one of the ancient land masses of the world, which accounts for the wealth of minerals.

The Guiana highlands are separated into two parts by the Essequibo flowing northward and the Branco flowing to the Amazon. They are highest in the west, and their rivers descend in falls through deep gorges. The table mass of Roraima (8530 feet) forms a watershed between the Orinoco, Amazon, and Essequibo.

The Brazilian highlands present a steep escarpment to the sea, giving the appearance of a mountain range, and rising to a height of between 8000 and 9000 feet. Westward its slope is gentle, with an average height of 2000 or 3000 feet. As in Guiana, rivers have dissected the highlands, but although they are much larger rivers they flow more gently, the Tocantins northward to the Amazon estuary, the Parana southward to the Rio de la Plata, and the São Francisco north and east to the Atlantic.

THE ANDEAN STATES

Venezuela partakes of the Andean region only in the west; part consists of the lowland of the Orinoco and the Guiana highlands, while on the north-west an alluvial plain slopes gently to the sea. On the Andes up to 8000 feet grow the forests of mahogany, dyewoods, and rubber. The forest zone covers nearly half the country. Below the forests, up to 5000 feet in the hot belt, coffee, maize, and tobacco grow in the uplands, and cacao, sugarcane, and rice on the lowlands. Above the forests, in the temperate and cool belts, hardier crops of beans, potatoes,

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and barley are grown. The *llanos* cover 100,000 square miles, a quarter of the whole area, and stock-raising (cattle and horses) supplies hides for an export trade which is next most important after coffee and cacao. Important gold-mines are worked to the south-east of Ciudad Bolivar. Coal is worked near Coro, and copper, asphalt, and petroleum are also found. Venezuela now ranks next to the United States in output of petroleum. Cotton and other manufactures are carried on to a small extent in the industrial area between Caracas and Valencia.

There are a number of short railway lines connecting important mining, agricultural, or pastoral centres to ports. Valencia and Caracas are also linked by railway.

Of the ports Maracaibo (75,000) is on a lagoon west of the gulf of that name. The original Indian settlements built on piles prompted the Spaniards to call the country 'Little Venice.' Coffee and cacao are exported. The cacao is of the finest quality. But La Guaira and Puerto Cabello, served by railways from Caracas and Valencia respectively, are the chief ports of the country. Their exports embrace the crops mentioned, minerals, and animal and forest products, which are sent chiefly to the United States, Britain, and France, to purchase in return machinery and manufactured foodstuffs. Guanta exports the asphalt and petroleum from the Barcelona region. Bolivar is the market and river port for the animals and products of the *llanos*, for rubber from the forests, and gold from the highlands. Caracas (135,000), the capital, is in the important coffee region, and though only six miles from the coast the railway from its port has to climb a pass of several thousand feet, so that it winds to and fro for over four times the distance. In addition to a small cotton industry there are cement and glass factories.

Colombia consists of the Caribbean coastal plains, ranges of the Andes, and the eastern plains. The total population is about eight millions. It has the advantage of coast both on the Pacific and on the Caribbean Sea, and benefits

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greatly from the Panama Canal. But the low-lying coastal plains have an unhealthy climate, and are thinly peopled. They produce valuable crops of bananas, pineapples, sugar, and cacao. The principal export is coffee, grown on the hill slopes. Cartagena (92,000), which is linked to the river Magdalena, by both rail and canal, exports coffee and the forest products of the Atrato valley, which include medicinal plants like cinchona, sarsaparilla, and cascara. On account of the bar across the river mouth Barranquilla (139,000) is connected by railway with the coast at Puerto Colombia (Sabanilla), and has captured most of the trade. Not only coffee and hides, but precious stones (emeralds) and minerals, are exported. Santa Marta to the east deals with bananas, cotton, and tobacco.

There is great mineral wealth—copper, iron, and mercury—awaiting development in the Andes. Rich gold-mines are found in many parts. Platinum is another important product. Coal of good quality is worked, and the production of petroleum has rapidly increased during the last year or two. On account of this, and also because of the healthier conditions, a third of the total population live in the Andes region. In the Cauca valley there are over 250,000 people. Here agriculture (maize, wheat, and coffee) and cattle-raising are the chief occupations. The plateau of Bogotá, containing the capital Bogotá (235,000) is rich in minerals, and is also the chief coffee-growing region. Salt is mined to the north of it, coal and iron to the north-east. Railways connect the Cauca valley to the port of Buenaventura and the Bogotá plateau to Honda on the Magdalena river. This river, over 1000 miles long, descends in a series of falls, but is navigable from Honda to the sea.

Ecuador. This wedge-shaped country cut by the equator, as its name implies, has a population of 1,500,000, mostly living on the plateaux. As in Colombia, the coastal plain on the one hand and the slopes of the upper Amazon on the other, both forested, are thinly populated.

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Cacao constitutes the chief wealth of the country, but production has declined, owing to competition from other sources of supply. The cacao-tree requires abundant heat and moisture, but also shade from direct sunlight and shelter from winds. It flourishes, therefore, best in plains and deep valleys, where soil is good and protection of other trees is available. The total production is now about 20,000 tons a year, and Guayaquil (100,000) is the centre and port for the trade and the largest town. It stands a hundred miles up the Guayas estuary, and is the first real western port south of the Panama Canal.

The capital, Quito (82,000), is situated on a plateau nearly 10,000 feet above sea-level. The railway which connects the two towns is about 200 miles long, but the journey is difficult and takes two days. Both towns are very subject to earthquakes, but, while the port is very unhealthy and subject to floods, the capital enjoys an eternal spring, with a seasonal temperature that never varies more than a degree or two about 55° F., and not more than 45 inches of rain spread throughout the year. The altitude accounts for the difference of temperature between the two places of nearly 30°.

Quito was the northern centre of the Incas, and is magnificently placed, with the snowclad peaks behind it. The white-walled houses, with red-tiled roofs, the Indians gaily clad in bright-coloured ponchos, the llamas, alpacas, and oxen carrying their burdens to and fro, add to its picturesque appearance.

The high mountain valleys of Ecuador grow wheat, barley, and vegetables, and provide pastures for cattle. Of the many minerals present gold and petroleum alone are worked. The making of 'panama' hats and the collection of rubber and other forest products are the other occupations. The bulk of the trade of Ecuador goes to the United States *via* Panama.

The Galapagos (tortoises) Islands, 700 miles from the coast of Ecuador, to which they were annexed in 1832,

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are a group of thirteen volcanic islands, one being about sixty miles long. Although on the equator, their climate is cooler than that of any other equatorial land. The Humboldt Current partly accounts for this, but the off-shore trade-winds also produce an up-welling of cold, deep water. No palms of any kind grow there, but the plant and animal life is interesting on account of long separation from the continent. Turtles frequent the coasts and there are giant tortoises. Inhabitants are few.

Peru. Along the coast for a thousand miles stretches a level sandy plain from twenty to thirty miles wide. But for the streams which descend from the Andes this would be almost a desert. Fortunately these rivers carry most water at the hottest season, so that wide irrigation is possible. The sea mist is another factor that helps to compensate for lack of rain. The air over the cold Humboldt, or Peruvian Current flowing northward, is chilled with consequent condensation. Further, the rapid radiation after sunset on the plains induces heavy dew. Rain seldom falls. The soils, however, are rich, so that wherever irrigation water is available good crops mature quickly in the high temperature. Cotton and sugar (for export) and vines do particularly well, but tobacco, olives, and even rice are grown. Cocoa cultivation is extending. The rice crop is chiefly due to the large number of Chinese settled here and the local supply has to be supplemented by imports. The total population of Peru is over six millions.

Callao and Mollendo are the ports for central and south Peru. Payta in the north will probably develop. Callao has most of the trade and has one of the best harbours along the coast.

From Callao (77,000) a railway runs up the Rimac valley to Lima, the capital. From Lima another railway climbs to the *punas*—the cold plateau over 15,000 feet high behind the maritime range. Its branches from Oroya to the north and south collect the valuable mineral products, petroleum, silver, coal, copper, gold, and many others.

SOUTH AMERICA

Pasco is famous for its silver- and copper-mines. Wheat and foodstuffs, timber, and textiles enter as imports.

The houses of Lima (265,000), the capital, are built with thick mud-brick walls and flat roofs, for rain is rare. But, as in many other towns of Spanish origin, there is a splendid cathedral. Electric light and power is available from the mountain streams.

From Mollendo, the mineral and woollen port, a railway runs through Arequipa to Puna, and so to Lake Titicaca, in the south, and to Cuzco, the old capital, now a mere shadow of its former greatness, in the north. The wool is obtained from the llamas, alpacas, and vicuñas, grazed in the higher valleys, where also the hardier cereals, potatoes, and beans are grown.

To the east and north are the headwaters of the great Amazon tributaries, but access is so difficult that it is easier to travel round by sea *via* the Panama Canal and up the Amazon. All the tropical produce of the *selvas*—hardwoods, rubber, gums, and medicinal drugs—is collected at Iquitos and sent down the Amazon.

Bolivia lost its coastline in the wars over boundaries fifty years ago. Like Peru, it has a dry *puna* between the eastern and western cordillera, and the hot, wet *montana* east of the Andes. To the south-east are the savannas of the upper Plata basin.

The population, numbering nearly three millions, is mainly of Indian or mixed descent and is concentrated chiefly on the plateau. The dryness and the high range of temperature between day and night render agriculture difficult. Potatoes form the chief food, while wheat and other crops are barely sufficient to meet home needs. Llamas, therefore, have similar importance to the reindeer of the Lapps or the yak of the Tibetans, supplying food, wool, and transport. Timber is very scarce, even the boats being made of rushes, with sails of plaited grass.

But Bolivia has great mineral wealth and mining is the only important industry. Silver and copper are mined in

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the western mountains and tin and gold east of Lake Titicaca. Bolivia ranks next to Malay in the production of tin, which in value forms 90 per cent. of the exports. The silver-mines of Potosí (34,000) have been worked for 400 years, and still yield, but Huanchaca is now more important. Oruro (silver, zinc, and mercury) and Sucre are market towns. Sucre (34,000) is the nominal capital, but La Paz is the chief centre, with over 146,000 inhabi-



FIG. 189. ALPACAS AND LLAMAS
Photo E.N.A.

tants. Although it stands in a hollow it is two miles above sea-level. It is served by railways northward to Puna and so to Mollendo (530 miles), southward to Antofagasta (735 miles) and toward the Argentine frontier. Westward another line runs to Arica (280 miles). These all follow natural but difficult routes. Bolivia is second to Brazil as a rubber-exporting country, but the rubber output of the *montana* region has decreased.

Chile, with a population of over four millions, occupies the southern half of the coast of South America, and is nearly 3000 miles long, while nowhere much more than 100 miles wide. Yet narrow as it is, it contains the highest peak of the Andes in Aconcagua (22,863 feet). Great climatic

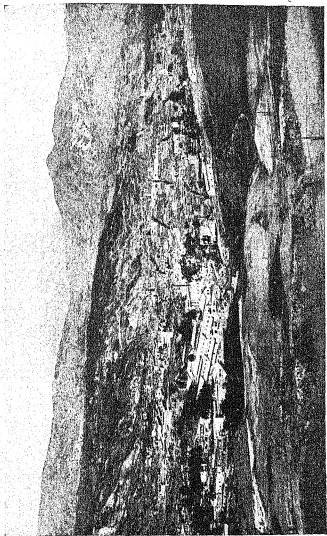


FIG. 190. LA PAZ, WITH MOUNT ILLIMANI IN THE BACKGROUND
Photo E.N.A.

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differences are found both between north and south and at different altitudes. In general, temperatures are low for their latitude, owing to the cold sea current. Structure and climate mark out three divisions: (1) the northern desert between latitudes 18° S. and 30° S.; (2) the fertile central valley between the coastal range and the main

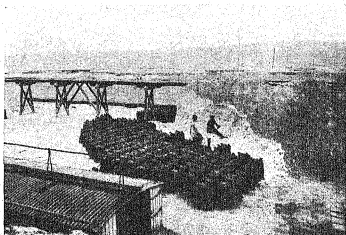


FIG. 191. FILLING BAGS WITH NITRATE FROM THE DRYING-FLOOR

By courtesy of the Chilean Nitrate Committee

chain, from latitudes 30° S. to 41° S.; and (3) the forested fjord coast south of latitude 41° S.

(1) The nitrates of Atacama bring back fertility to used-up soils the world over, yet nothing grows there owing to the absence of water. Guano is found near the coast in the north, but the deposits of nitrate of soda are some distance inland at a height of 3000 feet. It occurs in layers sometimes two feet deep. All water for human needs has to be taken there, the ports being supplied by canals or pipe-lines from the Andes.

Arica and Antofagasta export the minerals from Bolivia and send up clothing, provisions, and hardware. The

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chief nitrate port is Iquique, which ships a million tons a year. Coquimbo exports quantities of copper from the mountain ranges. Nitrates and copper form the bulk of the exports of Chile, which is the second largest producer of copper. There are also important productions of gold and silver.

(2) The central valley of Chile is about thirty miles wide. A fertile soil, numerous streams, and genial 'Mediterranean' climate combine to produce great crops of wheat, barley and oats, vines, vegetables, and fruits. This is naturally the prosperous region and most populated part. Houses of the land-owners have beautiful gardens, and the towns stand out against the mountain background of great grandeur. But the half-breed peasants who cultivate the land live in humble dwellings on small wages.

Santiago (538,000) is the fourth city of South America. It has wide, straight streets set at right angles. Through it runs the railway from the far north to the cattle-rearing plains of the south. To the west it is joined to Valparaiso, eighty miles away, and to the north-east *via* the Uspallata Pass to Argentina.

Valparaiso (191,000) is the next largest city. Its bay faces north, and is the best harbour of the whole coast. Its central position and its trans-Andine railway connexion make it the focus of both shipping and railway traffic. The Panama Canal facilitates its trade in vegetables, fruits, and animal products with the United States, from which iron and steel and general manufactures are imported. It is equally well placed for trade with Asia and Australia and with Europe *via* Magellan Strait.

Concepcion (70,000) stands at the mouth of the largest river and near the coalfields of the south. Coronel, on Concepcion Bay, is an important coaling-station.

(3) The southern region is not yet developed. But frozen meat, timber, and forest products are exported from Puerto Montt, while wool from the sheep pastures

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of Patagonian Chile is exported from Magallanes (formerly known as Punta Arenas) on Magellan Strait.

British Guiana, in the north of the continent, is the only British colony on the mainland of South America. It is about the size of Great Britain, with a population of 309,000, mostly of British, Indian, or negro descent. Although the coast is low and narrow and fringed with mangrove swamps, it is the part most occupied. The temperature rarely rises above 85° F. or falls below 75° F. The rainfall amounts to nearly 90 inches a year, but the steady north-east trade-winds, which are the chief climatic factor, make the climate not unpleasant. The higher south is quite healthy but thinly populated. Georgetown (57,000), the capital, seventeen days' journey from London, stands at the mouth of the Demerara river. It is finely laid out, has electric lighting, trains, and beautiful gardens. It stands amidst sugar and rice plantations and groves of coconut-palms. The Essequibo, Demerara, and several other rivers are navigable for steamers for fifty miles or more, until falls are met. The most famous are the Kaieteur Falls, five times as high as Niagara. The river banks are clothed with dense forests of the finest hardwoods (greenheart and mora), laced with creepers and brilliant with orchids, lilies, and lotus flowers. Humming-birds, macaws, and parrots abound everywhere in the forests. The 'bleeding' or tapping of the balata-tree, which produces a gum similar to rubber, is carried on by coloured labour. Rockstone, on the Essequibo, is a centre for this as well as for alluvial gold and diamond mining. Beyond the forests toward the Brazil frontier there are many hundreds of miles of savanna land, where thousands of cattle graze on the grasses, herbs, and dwarf shrubs.

Wismar, sixty-five miles up the Demerara, is the centre of the bauxite-mines. The crushed ore is sent to Canada to be made into aluminium. The villages are built on stilts, to avoid floods. There are roads and railways along the coast, between Georgetown and New Amsterdam, and

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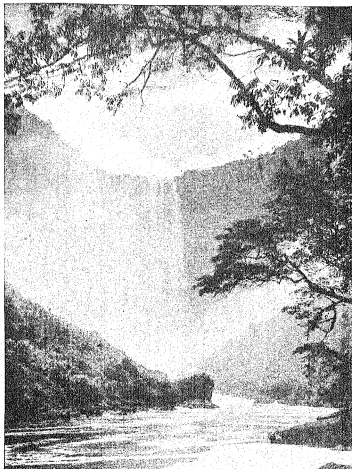


FIG. 192. THE KAIETEUR FALLS, BRITISH GUIANA

By courtesy of the Secretary of the Imperial Institute

to the Essequibo. But the drainage canals and rivers form the best means of communication.

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Dutch and French Guiana. The Dutch first colonized the whole area, and they reclaimed the land by constructing canals and dykes, as in their own country. Paramaribo, the Dutch capital, built at the confluence of two rivers ten miles from the sea, exports sugar, rum, cacao, coffee, and gold. Cayenne, the French capital, is used as a penal settlement. Neither is so well developed as British Guiana.

Brazil occupies nearly half the continent and contains half the population—viz., nearly forty millions. Two-thirds of it consists of the *selvas* of the Amazon, and the rest is chiefly the savanna land on the Brazilian highland. The coastal region is the most productive and thickly populated. So vast a country, with climatic conditions so favourable to plant life, has immense possibilities. With scientific organization, Brazil could lead the world in the production of many important commodities like rubber, cotton, sugar, cacao, tobacco, and all the forest products. It already produces most of the world's coffee. In addition, the cattle and mineral industries require only labour and better communication to become of leading importance.

In the *selvas* the only road to be found at present is at Manáos (83,000). This great modern city, although it is a thousand miles in the heart of the continent, exists only because it is a river port. It is near the confluence of the Rio Negro, and not far from the Madeira confluence. It is, therefore, the centre to which natives bring the crude rubber from the trees which grow wild in the forests; to which cabinet and dyewoods are floated down; and to which are brought the cacao, vanilla, and tapioca (made from the tubers of the manioc plant) grown in the clearings, together with Brazil-nuts and drugs from forest plants.

Para, or Belem (279,000), seventy miles from the open sea, has similar interests as Manáos, but on a larger scale, for the Tocantins valley leads to it. The mixed races who

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live there work in the forests, and grow cotton and cacao in the plantations round. It was once a great rubber port.

Maranhão, Parahyba, and Ceará are other ports along the north coast of Brazil. This is the chief sugar-growing area; but cotton, rubber, and coffee are also exported.

The highland savanna region has the advantage of being healthier than the *selvas*. The Matto Grosso region occupies nearly half the width and length of Brazil. Much



FIG. 193. SÃO PAULO

By courtesy of the "Manchester Guardian Commercial"

of it has scarcely been explored, still less inhabited. But diamonds and minerals are known to be present. Nearer to the coast is the province of Minas Geraes. At present this is the richest mineral province, with Ouro Preto the chief town. Goyaz, to the north, is also a rich mineral province. Manganese is extensively worked. Many precious stones—for example, diamonds and topaz—are obtained, and there are immense reserves of iron. Copper, mercury, and platinum await development. The difficulty is partly the lack of coal, which has to be obtained from southern areas and is inferior in quality. As there are numerous waterfalls water-power will help to solve the difficulty.

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Great use is already made of the savannas for cattle-ranching. Brazil has over 40,000,000 cattle, and frozen meat is an important export. Jerked beef—*i.e.*, sun-dried—is a popular article of food. Nearer the coast the cotton crop is increasing. Near São Paulo (879,000) both the yield and the quality are excellent. São Paulo has also silk-mills. The ilex-tree is widely grown for its leaves, which make yerba maté tea. Pernambuco, or Recife (340,000), is the chief port for cotton and sugar, which is manufactured and refined as well as exported. Bahia, or São Salvador (328,000), has an excellent harbour. Its chief exports are cacao and tobacco, together with the minerals from the interior sent down the river São Francisco. A railway links it to the river above the falls, which occur at a point three hundred miles from the mouth. Large quantities of the other Brazilian crops are also exported and many manufactures associated with them are carried on. Like Recife, it has oilfields near.

Midway between Bahia and the southern frontier stands the capital and chief port, Rio de Janeiro (1,432,000), which has one of the world's best natural harbours. Behind it the escarpment of the highlands rises to its highest point in the Sierra da Mantiqueira. The river Parahyba has deeply entrenched itself in a valley parallel to the coast, thus forming a second escarpment. Against this the south-east trade-winds deposit rain all the year round. On these slopes grow the coffee-trees, the seeds of which are so important to Brazil. The conditions which so much suit the coffee-tree are found in the high temperature, 68°–78° F., security from frost, rich soil, abundant rain combined with good drainage. The trees are usually planted between rows of other crops—for example, bananas, maize, or manioc—which help to bind the soil and also afford shelter from wind and sun. Much labour is required for weeding and preparing for market. Brazil supplies 72 per cent. of the world's total in the coffee markets of the world. Further, the whole railway system focuses on

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this area both along the coast and from Minas Geraes. Rio is thus able to serve not only the coffee interests, but the cotton belt on the *campos* and the ranching and mineral industries. With electric power it runs cotton- and flour-mills, cocoa, sugar, and tobacco factories. There are



FIG. 194. RIO HARBOUR

Photo E.N.A.

regular shipping services to Europe and the United States. Imports consist mainly of coal and manufactures from Europe and wheat from Argentina.

Santos, 300 miles to the south-west, is another great railway focus, serving the well-protected São Paulo area, which produces half the exports of the country. São Paulo is the rich coffee centre, and Santos exports three-quarters of the crop. Porto Alegre (273,000) is the port

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for the southern province of Rio Grande do Sul and exports hides and timber.

The industries of many of the towns include paper-making, silk, woollen, and jute mills, but the most important manufacturing industry is cotton-weaving.

Paraguay is about the size of England and Wales, but has only about 700,000 inhabitants, chiefly Indian half-breeds. Most of the country lies between the Paraguay and Parana rivers. Between the Paraguay and Pilcomayo rivers the forested Chaco (see under Argentina) produces large quantities of yerba maté (Paraguay tea), which grows wild. Oranges, grape-fruit, sugar-cane, rice, maize, and other food crops are grown, as well as cotton and tobacco. Paraguay claims from Bolivia a disputed part of the Chaco region. The natural pastures support about 4,000,000 head of cattle, besides sheep and horses, and the exports are mainly canned meat and hides.

Asuncion (142,000), at the confluence of the Pilcomayo and Paraguay rivers, is the capital. It is both a port and a railway terminus. The trade of Asuncion consists chiefly of meat, hides, and tallow, which go by steamer to Buenos Aires (985 miles). The railway route passes through Villa Rica, the next largest town.

Uruguay, the smallest of the South American republics, lies east of the Uruguay river and south of Brazil. Geographically it is a similar country to part of Argentina. Thus half the country is devoted to stock-raising, but like Argentina more land is being put under crops of wheat, maize, vines, and tobacco. Fray Bentos and Paysandu are famous meat-canning centres, and Salto marks the 'leap' or rapids, the head of navigation. The hills and valleys are well timbered, and probably contain minerals, being an extension of the Brazilian highlands.

Montevideo (459,000) contains a quarter of the population of the whole country. Its harbour is somewhat better than that of Buenos Aires, owing to extensive improvements. All the products of the country are sent to this

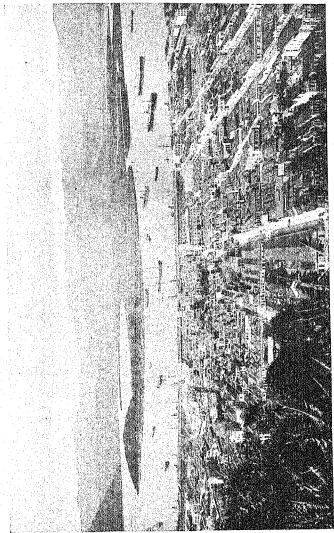


FIG. 195. SANTOS: THE GREATEST COFFEE PORT
By courtesy of the "Manchester Guardian Commercial"

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capital for export. These are almost entirely animal products; and the industries of the city consist of preparing meat for export in all its forms, as well as hides and wool. Cattle thrive in the warm climate, and it is claimed that their meat and hides are of finer quality than those of Argentina. Most of the trade is with the United States and Britain.

Argentina lies almost entirely south of the tropic, and has only a third of the area and a quarter of the population of Brazil. But the narrowing of the continent, the level, open country, and the temperate climate enable it to be more evenly settled, and its exports have double the value of those of Brazil.

In the north, the Gran Chaco country (the great hunting-ground) is a sub-tropical country, well wooded, little developed, and cut by the boundaries of Bolivia and Paraguay. The river Pilcomayo forms one of the boundaries. In the well-watered parts sugar-cane and tobacco are grown increasingly. The hardwood *quebracho* (the 'break-axe' tree) grows in profusion; its wood is useful for railway sleepers, and from it tanning extract is obtained. Cotton and yerba maté grow wild. To the west and south the Gran Chaco is rather dry, but large grasslands are available for cattle-grazing. Tucumán (91,000) is the chief centre, being well placed for water-supply and well served by railways. The Argentina-Bolivia route passes through it.

The western provinces, lying along the foot of the Andes, have a dry climate, but many streams supply water for irrigation. So that in the different temperatures varying with latitude and altitude a wide range of crops can be grown successfully. The vine, peach, and other fruits do well, as well as wheat, barley, oats, and clover crops like alfalfa. Mendoza is the centre of the wine area, and is important for being on the route of the trans-Andine railway, between Buenos Aires and Valparaiso, a journey of a day and a half. Coal and petroleum are mined near.

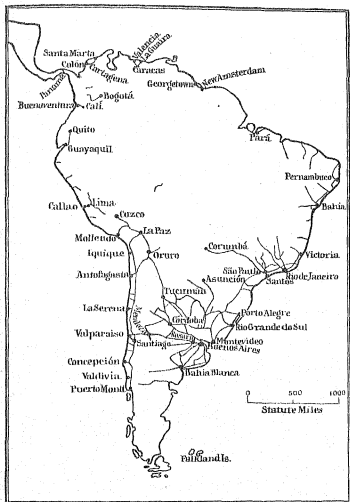


FIG. 196. THE CHIEF RAILWAYS OF SOUTH AMERICA

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In the east is the great pampas region, forming a huge semicircle around Buenos Aires, and extending from the Rio Colorado in the south to Porto Alegre in Brazil. Less than a century ago this was a virgin land of grass and flowers, inhabited only by the mounted *gauchos*, who tended the roving herds of cattle and horses. By replacing the original Spanish breed of cattle by the best English

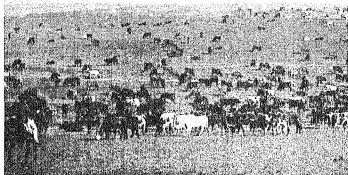


FIG. 197. A CATTLE HERD ON THE PAMPAS

Photo E.N.A.

stock, and by the cultivation of good fodder crops, the productiveness of the region has been vastly increased. Great companies (Bovril, Oxo, Lemco) and private stock-owners have so organized the industry that meat and meat extracts, hides, and other animal products constitute a source of great wealth. Córdoba (239,000), in the west of the area, is a great centre for the cattle and meat industries.

But large tracts of country in Entre Rios (between rivers Parana and Paraguay) and elsewhere are now under the plough, and this region has become one of the world's

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granaries, supplying more than half of the total exports. Wheat, maize, barley, and oats are sown, reaped, and threshed by the most modern machinery. Linseed is another important crop. Half the cultivated land is under wheat. Argentina has many advantages over Canada for wheat-growing. Its mean annual temperature is 60° F., and frost is absent; soil is easier to work, and the smaller



FIG. 198. A LAKE IN THE PATAGONIAN ANDES

By courtesy of the Argentine Consul

yield per acre is due more to the way it is cultivated than to a lower fertility of its loess soil. The Argentine area is nearer its ports and more widely served by railways, and the ports are available at all seasons. Argentina has a greater quantity of wheat for export, but has to send it twice as far as Canada to reach European markets. Fortunately for Europe, the harvest falls in January, when supplies from the Northern Hemisphere have been largely consumed. Rosario (452,000), 150 miles up the Parana, but accessible by ocean steamers, has good natural advan-

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tages for handling the grain crop, and is an important railway centre.

Buenos Aires (2,030,000) is the largest city south of the equator, and the hub of Argentina. Railway and shipping routes radiate from it. Its list of exports includes produce from the whole country—frozen meat, hides, tallow, butter, grain, and wine. Great manufactures connected with flour, meat-extracting, canning, and brewing are carried

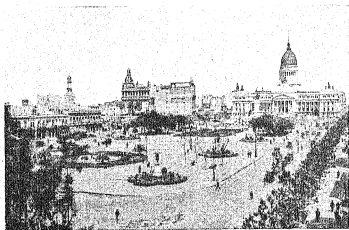


FIG. 199. THE CONGRESS SQUARE, BUENOS AIRES

By courtesy of the "Manchester Guardian Commercial"

on, and machinery, timber, paper, tobacco, and foodstuffs are made. As the name implies, it has a healthy climate. Though healthier than Rio, and having a more productive hinterland, Buenos Aires is less fortunate in its harbour, which is largely artificial, owing to the sandbanks formed by the river deposits. La Plata, at the mouth of the estuary, is an outpost, with a similar trade.

Bahia Blanca (45,000) is the railway centre and port for the south of the area. Just as the wheat-growing area is being pushed northward and westward in Canada, so it

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is spreading south and westward in Argentina. This port will therefore grow and become both a wheat and timber port.

South of Bahia Blanca the country becomes drier and colder, with the temperature between 40° and 60° F., for the country is in the latitudes of the westerly winds, but on the lee side of the Andes. Patagonia has deciduous forests on the eastern slopes of the Andes. But much of it is shingle desert, with only sage-brush vegetation. Dry grassland is available for sheep-rearing in places, but the population is scanty. The principal industries of the country are meat refrigeration and flour-milling. Mining is of no importance, although gold, silver, and copper are worked as well as coal in the Andine province.

The Falkland Islands, lying 300 miles off the south coast, are an important British Crown colony, because they command the route through Magellan Strait. Port Stanley (800) is on the north-east of the largest island on a fine natural harbour and is the capital and only town. Its sheltered harbour is useful as a naval base. Owing to the bleakness of the islands, sheep-rearing is the only general occupation. Wool of considerable value is exported to Britain. But whaling in the Dependencies produces the most valuable products, with an annual value of nearly £4,000,000.

South Georgia, lying in an isolated position nearly a thousand miles to the south-east, is the chief dependency of the Falklands. It is a great whaling centre for companies from Norway and South America as well as Britain. The island is heavily glaciated.

CHAPTER XXIX

AFRICA—SOUTH AND EAST

COMPARISON has already been made of this large compact continent with the other southern continents. Composed mostly of rocks, little disturbed, and lying almost horizontally, the relief appears monotonous, and the physical divisions are not so obvious from the map as in South America. The vast plateau, which the continent appears to be, is, however, marked by many differences. In the north its average height is about 1500 feet, but in the



FIG. 200. IDEAL SECTION FROM THE SOUTH COAST OF AFRICA TO THE ORANGE RIVER ALONG LONGITUDE 22° E.

south it is over 3000 feet. Structurally, too, the Atlas region is not part of the plateau, but is akin to the fold mountain system of Southern Europe. The Sahara Desert, including its extensive highlands, rising to a height of several thousand feet, forms a distinct division, which has acted as a great barrier between the Mediterranean coast and the rest of Africa. But in the east, this desert belt is cut right across by the wonderful valley of the Nile, forming a separate region. Again, to the south of the desert another division can be noted in the Sudan, which stretches across the continent from the Niger basin to the Nile. Distinct in character from those mentioned is the coastal region of West Africa north of the equator. In the east, the volcanic mountains of Abyssinia form another definite feature. Similarly, in the centre and south there

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may be noted separately the Congo basin, the great plateau of East Africa, with its rift valleys and lakes, and finally the plateau of South Africa (including the basins of the Zambesi, Limpopo, and Orange rivers) and the Kalahari Desert. These divisions have differences of climate and vegetation as well as relief. The plateau generally rises from the coast in a series of steep-faced terraces, and as each terrace is surmounted there is a slight descent to the plateau behind it. Through this rim the rivers cut their way to the sea, and so are impeded by falls and rapids.

The Peoples of Africa. The natives belong to two great types of mankind:

(a) *Caucasian*, comprising: (1) Hamites, like the Berbers of Morocco and Egyptian fellahin, or the Tuareg of the Sahara. They are mostly engaged in agriculture, and are Mohammedan in religion. (2) Semites—the Arabs, Bedouins, and the Abyssinians. They are usually nomadic and pastoral. The Abyssinians profess Christianity. These peoples vary in colour from olive to brown. Their eyes are set straight, the nose is well formed, narrow and straight, and lips normal.

(b) *The Negro Races*. These occupy two-thirds of the continent and comprise: (1) The Sudanese between the Sahara and the equatorial forests, of whom the Hausas are an example of the most civilized type. Many of these people have also Arab blood. (2) The Bantu between the equator and the Kalahari, who are mainly hunting and agricultural peoples. The finest examples are the Zulus and the Matabele; other well-known tribes are the Basutos, the Barotse of North-west Rhodesia, the Mashonas of Southern Rhodesia, and the Bambala of the Congo. The Hereros of South-west Africa are pastoral. The term 'Kaffir' applied to them in South Africa means intruder, and they probably spread southward from the Lake Plateau. (3) Hottentots and Bushmen, who are probably the remains of the aboriginal races who have been driven

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south by the Bantus. The Hottentots occupy the western areas of the Cape province and South-west Africa, where the Bushmen also live by hunting. (4) The Negritos and Pygmies of the tropical forests. These dwarf races are the least civilized.



FIG. 201. A ZULU CHIEF STANDING IN FRONT
OF HIS HUT

Photo South African Railways

The Negroes have dark skins, ranging from deep brown to black, black hair, which is curly owing to being flat in section, broad nose, thick lips, protruding jaws, and receding foreheads. Among the Bantu tribes hunting was esteemed the honourable life, agriculture being left to the women. Agricultural and pastoral tribes were generally

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liable to conquest by the hunters, who used spears, shields of hide, and bows and arrows. But they were also clever craftsmen in wood and metal, weaving, and pottery, though the last is nearly always made by women.

The intrusion of Europeans has completely altered the balance. Most of the native races are now engaged in agriculture and till their own land, or are stock-breeders. The Dutch (Boer) and Huguenot settlers in the Cape, with their intensely Protestant views based largely on the Old Testament, have always taken a different view from that taken by the British of the native races. This difference has raised many problems in the past, and the Government of the Union of South Africa has constantly to deal with matters arising from these differences.

All Africa, except Abyssinia, Liberia, and Egypt, is now under European control. Only, however, in the more temperate regions of South Africa, and the Barbary states in the north-west, is European settlement extensive. In the highlands of East Africa it is growing. Elsewhere the Europeans are mainly rulers, managers, and traders.

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The plateau structure of the continent is most marked in British South Africa. The way in which the land rises in a series of terraces can most usefully be studied by typical railway routes from the coast to the interior, such as that from Cape Town by Worcester, De Aar, and Kimberley to Mafeking, or that from Mossel Bay to the north, or that from Durban to Johannesburg.

The railways illustrate that the terraces by which the high veld is approached cannot be avoided. But these very difficulties render them indispensable, for by no other means could the resources of the interior be developed—the rivers being useless for transport and the distance too great for other modes of conveyance. Note too that as the coastal plain is not continuous there is no continuous

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coastal railway. Practically all movement is from the coast to the interior. There are 12,500 miles of main line and 80,000 miles of highroads. From below, these terraces look like mountains. As the rivers indicate, the general slope of the plateau is westward, and the highest land is in the east, along the Drakensberg Mountains. This high edge curves round parallel to the coast in ranges of



FIG. 202. ZULU HUTS ON THE VELD
Union Castle Line

different names—Quathlamba, Stormberg, and Nieuwveld Mountains. Between the main system and the coast run lesser ranges, like the Zwaart Berg and the Lange Bergen, which enclose between them the Little or South Karroo, while the basin between the Zwaart Berg and the main chain is the Great Karroo. The passes are generally known as *poorts* or *kloofs*. Thus from the south coast inland, the series of plateaux may be summarized as follows: (1) the low coast plateau; (2) the South or Little Karroo; (3) the Central or Great Karroo; (4) the North Karroo, extending roughly to latitude 30° S.; and (5) the high veld and Kalahari.

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Reference has already been made to the way in which this structure retarded exploration, affects climate, and must remain a permanent hindrance to the development of Africa.

The rivers, fed only by summer rains, lie deeply entrenched, and are usually shallow at the fords or drifts, but impassable in flood, and descend to the coast in waterfalls. They are thus a series of barriers rather than routes. The Orange, with its tributaries the Caledon and Vaal, and the Limpopo are used as boundaries for hundreds of miles.

The Union of South Africa. This Union contains the provinces of the Transvaal, Orange Free State, Natal, and the Cape of Good Hope. Administrative government is centred at Pretoria, but Parliament sits at Capetown. The population of the Union is nearly 8,000,000. The European population, however, is only 1,750,000, so that coloured races outnumber the white people of Dutch, British, or French descent by four to one. Immigration is slow compared with that of some of the other Dominions.

The mean annual temperature is fairly uniform throughout the Union—viz., about 63° F. But both the daily range and the annual range increase with distance from the sea and with altitude. Ocean currents lower the air temperature along the west coast as compared with the east, but only for a short distance inland. Sunshine is abundant (from 60 to 75 per cent. of the possible amount as compared with London's 29 per cent.). Rainfall is heaviest (about 40 inches) along the coast near Durban and round Cape Town. Elsewhere in many parts it does not exceed 20 inches. It is both irregular and frequently torrential, and associated with thunderstorms. Rain falls chiefly in summer over most of the area. But in the south-west winter rains are more abundant. The boundary between the winter rain region of the south-west and the summer rain region of the east passes from the coast near Port Elizabeth to the neighbourhood of the mouth of the Orange river along a path roughly parallel to the coast.

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The natural vegetation of the veld is chiefly 'grassland,' but much of the grass is wiry, and not suitable for making into hay for winter feed. Patches of true forest are found only along the south coast and on the windward slopes of the eastern mountains. But settlers have introduced new plants, and considerable plantations of gum-trees (acacia), which grow quickly, have been made on the veld, especially round Johannesburg.

The chief occupation is therefore pastoral farming. There are 42,000,000 sheep, 10,000,000 cattle, 7,000,000 goats, besides pigs, donkeys, and ostriches. The chief dairying districts are those around Port Elizabeth and East London. Sheep are most numerous on the Karroo and in the Orange Free State, goats on the Great Karroo. For agriculture, irrigation is everywhere necessary except in the Cape Town area and south of the Drakensberg Mountains. The chief irrigated areas are in the Graaff-Reinet, Oudtshoorn, and Pretoria districts. Mining is the other main industry. The value of agricultural productions is not much less than that of the mineral production, and agriculture employs more people than mining. The outstanding crop is maize, grown especially on the high veld. Known as 'mealies,' it is the staple native food. In the Cape Town district winter rains and summer heat favour fruits and wheat. Along the south coast are found rich dairy pasture, maize and tobacco crops, and woods thick with flowers. Fruit, as well as vegetables and tobacco, is also grown under irrigation round Oudtshoorn.

In Natal, climate and productions vary with altitude. Temperatures are higher and abundant rain is brought by the south-east trades, so that sugar, cotton, pineapples, plums, and bananas are found on the hot coastal plain, tea, maize, and wattle (mimosa bark used for tanning) on the middle slopes, and sheep pastures above. Pietermaritzburg (40,000), the capital of Natal, with brewing, tanning, bootmaking, furniture, and iron industries, stands

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amid scenery of typical beauty. Ladysmith is a railway junction and centre of the Klip river farming district, about 200 miles from Durban.

The Orange Free State is a land of high veld, 4000 to 6000 feet, with characteristic *kopjes* (hills rising like islands from the plain), green and flowering in the summer

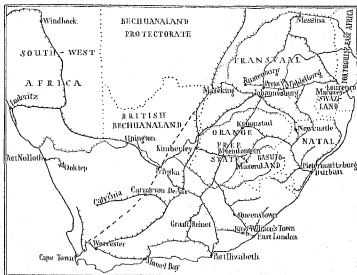


FIG. 203. UNION OF SOUTH AFRICA: PRINCIPAL RAILWAYS

A suggested new main railway is shown by the broken line.

(November) and dry and dusty the rest of the year. Bloemfontein (42,000), the capital, is surrounded by pastoral settlements. It is an educational centre and has engineering, wagon-making, and milling industries.

The Transvaal is partly high veld in the south-east with sheep and cattle pastures; partly middle veld, 3000 to 4000 feet, where maize is cultivated; and bush veld and low veld below 3000 feet, suitable for tropical crops, but infested with the tsetse fly, and not suitable for

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white settlement. Johannesburg (300,000) is the largest city in the state, and the chief railway centre. Johannesburg is now a beautiful city; although the mines run through the town they do not spoil it. Great attention is being paid to the architecture of new buildings. The university and gardens are a feature of the town. It is the chief railway centre of the interior, with routes to the Cape, Durban, Pretoria, and Lourenço Marques. Pretoria (80,000), to the north, is the Government centre. It is surrounded by fertile and irrigated country important for tobacco-growing. Its industries centre round iron and steel, railway works and tobacco.

Gold heads the list of exports in value. This mineral was discovered in the Witwatersrand in 1868, and in 1886 the first dwellings at Johannesburg were put up. The gold occurs round the edges of pebbles embedded in the conglomerate rock of the 'Reef.' The rock is bored and blasted, then crushed and the gold extracted. The area worked extends over sixty miles, with Johannesburg in the centre. It has so far produced gold to the value of £1,000,000,000. The area now produces about 50 per cent. of the annual production of the world. The industry employs directly over 22,000 Europeans and 230,000 natives, but indirectly over 250,000 and 1,000,000 respectively are dependent upon it. In various ways the industry has paid 39 per cent. of the Government revenue.

Diamonds occur in 'pipes' of 'blue ground,' which were formerly volcanic outlets. The clay is crumbled by drying or crushing and then washed. Kimberley is the greatest centre. Jagersfontein, in the Orange Free State, is another. A third area lies east of Pretoria. Recently diamonds have also been found in South-west Africa, on the Panama fields, near Lüderitz. The total value of diamonds discovered in South Africa amounts to £284,000,000. For 1928 the value was over £16,000,000. The cutting of diamonds is done in Johannesburg, Pretoria, and Kimberley, but the majority are sent to Amsterdam or London.

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Coal occurs fortunately overlying the gold reefs on the East Rand and near Vereeniging to the south. In the Rand area there are factories for making explosives, cement, soap, flour, and hardware. Middelburg, in the Transvaal, raises half the output. In Natal, Newcastle, Dundee, and Vryheid are the chief centres. The Natal coal is the best in quality and is much sought after for

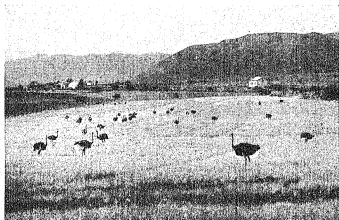


FIG. 204. AN OSTRICH-FARM ON THE KARROO IN SOUTH AFRICA

Photo South African Railways

bunker purposes. The output in South Africa amounts to about 12,000,000 tons in a normal year. There are also small outputs of tin, asbestos, and copper in the Transvaal and the Cape. Much is hoped from recent discoveries of platinum and nickel.

Among the agricultural and pastoral industries wool is the most valuable export. Graaff-Reinet is a collecting centre. The Union grazes 42,000,000 sheep, and yet there is room for expansion in the Transvaal. Mohair from Angora goats, hides, and skins come next. The demand for ostrich feathers has declined, but has recently improved

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with a change of fashion. Of the cereals, maize alone is exported in quantity. Cotton is grown chiefly in the Transvaal and Zululand. The demand for Empire tobacco has doubled the export of this crop. It is grown chiefly in the Transvaal as well as in the valleys near the south coast

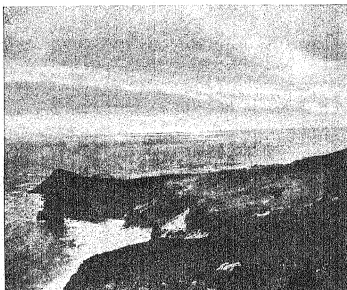


FIG. 205. SUNSET AT THE CAPE OF GOOD HOPE

By courtesy of the Publicity Department of the South African Railways

and in Natal. Sugar-cane and wattle are also cultivated in Natal. The acacia timber is used for pit-props and its bark for tanning. The export of fresh fruits, oranges, grape-fruit, pears, peaches, and plums, canning, and jam-making is carried on at the ports.

Cape Town (131,000 white, 98,000 coloured) is the metropolis and gateway of South Africa. Its harbour is now protected from north-west gales by breakwaters. It is a great passenger port, with railway service to all parts ;

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to Bukama, in Belgian Congo, 2600 miles, with branches to the east coast ports, including Beira, in Mozambique, and to Walvis Bay and Lüderitz on the west coast. It exports most of the gold and diamonds from the veld, wool, mohair, hides, skins, ostrich feathers from the Karroos, fruit, and wine. Freight vessels bound for the east, avoiding the expensive Suez Canal route, call for coal and cargo. It is also a base for whaling and fishing vessels. The industries centre round milling and the preparation of foodstuffs.

Durban (180,000) is the chief east coast port, with a deep, roomy, well-protected harbour. It has the advantage of being nearer to Johannesburg than Cape Town, and also within eighty miles of a valuable coalfield. It exports the minerals and animal products. Manufactures of sugar, leather, and fibres are carried on. Much of its trade is with Mozambique and Mauritius. Goods handled at Durban exceed in bulk, but not in value, those shipped at Cape Town.

Port Elizabeth (65,000) has grown rapidly and is now a busy city, manufacturing soap, leather, and flour. There are also railway and motor-car works, as well as wool-weaving plant. It is also a port for passenger steamers and the trade in grain and animal products. East London (38,000), the chief wool port, has a fishing industry. It is also a popular pleasure resort.

South-west Africa. The Union has the mandate of this country, which lies between the Cunene and Orange rivers. The population consists of 24,000 whites and over 234,000 native and coloured races. Diamonds and copper are worked near Windhoek, in the centre, and Otavi, in the north. Windhoek, the administrative centre, is connected by railway with Walvis Bay, the port. Some cattle and sheep are reared, and a little wheat and maize are grown where artesian wells provide water. The Ovambo in the north, Hereros in the centre, and Hottentots in the south, are pastoral peoples, but most of the country in the south and east is quite barren.

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Bechuanaland Protectorate is mainly desert, but along the railway from Cape Town to Bulawayo there is rough grassland interspersed with trees ten to fifteen feet high. The natives make articles of wood and prepare skins. Mafeking is the seat of Government and a commercial distributing centre. Alluvial diamonds are found in the near neighbourhood.



FIG. 206. VICTORIA FALLS

Rhodesia. Although outside the Union, Rhodesia south of the Zambesi is geographically part of it. The height of the plateau, which is between 4000 and 5000 feet, moderates the temperature, and compensates for its being well within the tropics. Southern Rhodesia is a self-governing part of the Empire, and Northern Rhodesia is a Protectorate. The former is the more developed, and although only half as large as the latter, has a higher production of minerals, crops (maize, wheat, cotton, tobacco, and fruits), and cattle. The Victoria Falls of the river Zambesi, a mile wide and 343 feet deep, discovered by Livingstone in 1855,

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are magnificent and attract tourists, who also visit the grave of Cecil Rhodes in the Matopo Hills. The river gorge below the falls is now crossed by a railway bridge, within reach of the spray. Above the falls the river is over a mile wide and navigable, but it fluctuates considerably in volume, the variation in depth amounting to 50 feet. Wide tracts of Rhodesia consist of undulating plains, covered with long grass but bare of trees; in the bush country woodlands break up the open plain. The ranges of hills which form the watershed run north-east from the Matopo Hills, near Bulawayo, and the water-worn granite *kopjes* are generally well wooded.

Bulawayo (18,000), on the railway, 1360 miles from Cape Town, is a very spacious town, standing amid valuable mining and cattle-grazing country. Outside the town are cement-works, for cement is costly to import. Bulawayo is a junction for routes north-west to Zambesi and Livingstone, the capital of North Rhodesia, a distance of 287 miles, and the route north-east to Salisbury, the administrative centre of Southern Rhodesia. The towns are markets for the farming areas around them. The grasslands, with patches of bush, on the north and west of Salisbury are particularly fertile. Maize and tobacco are the chief crops.

The gold reefs lie along the watershed between Bulawayo and Salisbury, and the value of the output in 1928 was nearly £2,500,000. Asbestos and chrome ore come next in value, but silver, copper, and many other mineral products are being developed. In both parts of Rhodesia minerals constitute from half to three-quarters of the exports. Coal occurs along both banks of the Zambesi, but is chiefly worked at Wankie, 200 miles north of Bulawayo, where its quality approaches that of South Wales coal. In Northern Rhodesia lead and zinc, with some copper and coal, are worked around Broken Hill, near the frontier of Belgian Congo. Lead forms the chief export, but the value of live stock, maize, and tobacco,

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exported mainly to Katanga, in Belgian Congo, exceeds the value of the export of any other mineral. Beira, the Portuguese port, exports the products of both Rhodesia and Nyasaland.

Nyasaland. This protectorate occupies the southern Lake plateau. The lake is 350 miles long, drained by the Shiré to the Zambesi. The deepest part of the lake is several hundred feet below sea-level, although the surface level is 1500 feet above it. It is one of the Rift Valley lakes. The terraces to the south of the lake, down which the river tumbles in rapids, are known as Shiré Highlands, which are rich in minerals. The valleys produce rubber and tropical plants. The plateau areas are mostly savanna land, roamed by herds of game, but crops of tobacco, cotton, and coffee do well. Tobacco now forms nearly four-fifths of the exports; cotton and tea, together with some coffee and sisal, make up the remainder. The preponderance of native races over white in these regions is marked. Nyasaland contains only 1900 Europeans (chiefly at Blantyre and in Shiré Highlands), while natives number 1,326,000. Even in Southern Rhodesia the ratio is twenty-five to one. The natives are more civilized than those in the forests. The men work the land, and are skilful in making iron articles, plaiting grass, and in basket-making, while the women are deputed to make pottery. Maize flour is the chief food, taken in various ways with fish, or meat, sometimes flavoured with pepper, or even white ants!

Mozambique (Portuguese East Africa). Before considering the rest of British East Africa we must briefly review this country, which shuts off Rhodesia from the Indian Ocean. With a coastline extending well over a thousand miles, and a breadth increasing from thirty miles at Delagoa Bay to over five hundred miles in the north, its area is more than twice that of the British Isles. The population includes 3,500,000 natives and about 36,000 Europeans.

It shares with Rhodesia the mineral resources of the

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Zambesi basin—gold, coal (round Tété), and oil east of Lake Nyasa. Having a rainfall of 40 to 45 inches and tropical temperatures modified by elevation, it is a fertile agricultural country. Sugar is grown extensively, especially in the lower valley of the Zambesi. Fibres, sisal,

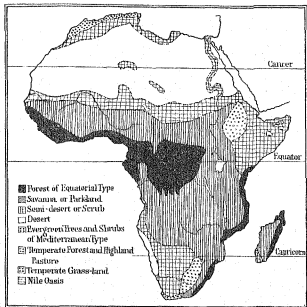


FIG. 207. AFRICA: NATURAL VEGETATION

kapok, and cotton, timber, including mangrove bark for tanning, and maize are also exported. The prosperity of its ports, however, depends largely upon transit trade from the British territories in the hinterland.

Laurenço Marques (37,000), the administrative centre, on Delagoa Bay, claims to have the best harbour in South Africa. It draws upon the trade of the Transvaal, particularly the trade in coal.

Beira is the chief port, and no fewer than eighteen

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shipping lines call there, for it is the only good harbour between Lourenço Marques and Mozambique, a distance of a thousand miles. The railways enable Beira to export not only the products mentioned above, but those of Rhodesia, Nyasaland, and the rich mineral area of Katanga, in Belgian Congo. The railway to Beira from all these places is shorter than to any other port.

British East Africa. In East Africa and South-west Asia the earth's crust shows lines of roughly parallel faults, between which subsidence took place. These are the rift valleys. Along these lines of weakness a number of volcanoes and lava flows have occurred. Many lakes lie in the valleys (see Fig. 211).

Two branches can be distinguished: (1) The eastern branch, beginning in the Jordan valley, is continued in the Gulf of Akabah and the Red Sea, and passes round the east of Abyssinia. Its path is marked by Lake Rudolf and many smaller lakes, to Lake Nyasa and the Shiré valley. Many of the lakes in this valley have no outlet. (2) The western branch, beginning in the valley of the Nile, is marked by Lakes Albert, Edward, Kivu, and Tanganyika to the north of Nyasa, where it joins the eastern valley. These lakes are all deep, long, and narrow and are sunk far below the level of the plateau, shut in by precipitous valley walls; for example, Tanganyika is 400 miles long, 4000 feet deep in places, 2500 feet above sea-level, but also 2500 feet below the level of the plateau. These rift valley lakes are in strong contrast to the other lakes of Africa, which are usually round or broad and shallow, with low shores; for example, Victoria (on the plateau between the rift valleys, and as large as Scotland), Chad, Bangweulu, the salt pans of the Kalahari, or the Shotts of the Atlas Range.

Elgon, 14,140 feet, Kenya, 17,040 feet, Kilima Njaro, 19,320 feet, the Mfumbiro volcanoes near Lake Kivu, and Ruwenzori, 16,794 feet, between Lake Edward and Lake Albert, should be found on the map.

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Rhodesia, Nyasaland, and Mozambique, occupy the southern end of this rifted plateau.

The countries occupying the northern end of the Lake Plateau are Tanganyika, Kenya, and Uganda.

Tanganyika Territory. The country rises in terraces from the coast, as is general in Africa. Along the coast of this mandated territory grow luxuriant forests of wild rubber, ebony, oil-palm, and gum-trees, and plantations of coconut-palms, sugar, bananas, and cotton. From the hard resins of the trees copal is made and used to produce varnish.

On the north-east coastal highlands (Usambara) are tropical forests. Farther inland Mount Kilima Njaro provides the typical range of vegetation at different altitudes. Tall grasses and bamboo forests at the foot, then coffee plantations and maize, then savanna land, which is used for cattle and sheep pasture. Next come the temperate forests, conifers, Alpine grassland, and finally glaciers and snow desert. In the lake region the forests are of the equatorial type. Cultivations of rice and coffee are found in the valleys. On the savanna land, crops of sisal and ground-nuts are grown, and on the plateau cattle are grazed. About 5,000,000 cattle and 5,000,000 sheep and goats are grazed by the natives.

Communications have improved. Railways run: (1) from Tanga to Moshi, 219 miles; (2) from Moshi to Voi in Kenya; and (3) from Dar-es-Salaam to Kigoma, 772 miles, with a branch from Tabora to Mwanza on Lake Victoria. There are also 25,000 miles of roads passable in the dry season. Ports of the mainland, Dar-es-Salaam, Tanga, and Lindi, are now competing with Zanzibar for trade, but some have a less healthy climate and other drawbacks. Sisal, cotton, coffee, hides, copra (dried coconut), and ground-nuts are the exports. Dar-es-Salaam (26,000) is the best of the coastal ports, but lighterage is necessary. Trade from the Congo and cotton from the plateau is brought by the railway. Tanga exports chiefly

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sisal and coffee. Moshi and Arusha, near the Kenya boundary, are the chief European settlements.

Zanzibar and Pemba. These small islands contain a relatively large and cosmopolitan population (238,000),

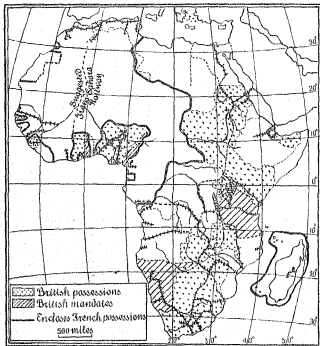


FIG. 268. BRITISH AND FRENCH POSSESSIONS IN AFRICA
After Bowman

centred round the town of Zanzibar. The special crop is cloves, which are the dried, unopened buds of an evergreen. Over 90 per cent. of the world's supply of this spice is produced in Zanzibar, India and Britain being the principal markets therefor. Coconuts and copra are other products. Zanzibar, on the west coast, strikingly picturesque, was formerly the *entrepôt* for the trade of East

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Africa, owing to its central position and the shelter from the monsoon winds its harbour affords. But the expansion of mainland ports, coupled with extended shipping services, has considerably reduced this activity. Nevertheless the convenience of the port, and the fact that watering facilities offered to vessels of all types are the best on this part of the coast, assure a continuance of *entrepôt* trade.

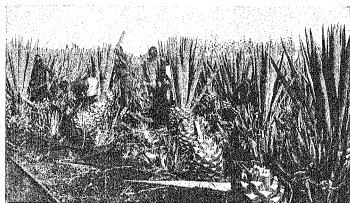


FIG. 209. SISAL

Information Office of H.M. Eastern African Dependencies

The bulk of the imports and exports are therefore goods intended for and coming from the mainland.

Kenya. The equator crosses both the Crown colony of Kenya and the Protectorate of Uganda. These countries are similar in structure, climate, and vegetation to Tanganyika. The coastal plain is fringed with mangrove swamps. The coconut-palm is important. Rice and sugar are grown on the wet low-lying areas. The lower parts of the plateau are mainly reserved for the natives, who graze large numbers of cattle. Large areas of the highland are reserved for white settlement, but planters are dependent upon native labour. There are also many Indian settlers. Coffee is the chief crop. Sisal, maize, and

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wheat are also grown. Dairy and wool industries are growing in importance. Mombasa (50,000), like Zanzibar, has a long history with Arab and Portuguese associations. Its modern buildings contrast with thatched native huts in a setting of palm-trees and deep blue sea. A railway joins Mombasa Island to Nairobi, the capital; to Nakuru, the junction for Kisumu, on Lake Victoria; and to the waters of the Nile, a distance of over 700 miles. There are



FIG. 210. CANOES ON THE TANA RIVER, KENYA

Union Castle Line.

also six branch lines, which together total over 500 miles. On reaching the mainland the line climbs the first terrace at 800 feet, covered with dry scrub, owing to the porous rock. Then the savanna land, with its big game reserves, is crossed, to reach the rich Kikuyu grasslands. On these lands native tribes, like the Masai, lead a nomadic pastoral life, following their herds within the boundaries of their reserve. Nairobi (51,000) is both a road and railway centre, as well as the chief white settlement. Beyond Nairobi the train climbs to a height of 7800 feet on the edge of the rift valley. The other edge is only forty miles away; but to reach it the train descends through forests for 1500 feet, crosses the floor of the valley, and then

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climbs again to reach the plateau at 8300 feet. The final descent to Kisumu, the lake port and air route depot, crosses rolling savanna moorland, through cedar-woods and tropical forests, with banana plantations in the clearings. The journey takes two days. A steamer service runs between Kisumu and Entebbe in Uganda.

Uganda. Lake Victoria modifies to some extent the temperatures already lowered by the height of the plateau. But the marshes around the shores of the lake encourage insect pests. This nuisance is being reduced by clearing the ground, so that malaria and sleeping sickness are much less rampant than formerly. Although the natives keep many cattle there are no horses. The natives of Uganda—for example, the Baganda—are more intelligent and eager to work than those of Kenya. Great attention is being paid to education. As a result there is a widespread cultivation of good cotton, which provides 90 per cent. of the export trade. European planters grow chiefly coffee, together with some sugar-cane and tobacco. The natives also grow ground-nuts and other crops for their own use. The banana plays a big part in their lives. It is cooked in various ways, and a drink is made from it. Its fibres and leaves are also used for baskets, etc.

Little has so far been done with the mineral wealth of the country, but exports of tin in 1929 were worth over £63,000. Oil-wells may shortly be opened. Plenty of power from waterfalls is available. As an inland country Uganda is largely dependent upon cheap transport. The railway round the north of the Lake avoids the break of bulk *en route*. But even so, the heavy Suez Canal dues and the long distance by sea on the other route necessitate the cheapest possible production of goods, which have to compete with other sources of supply. A network of nearly 1000 miles of good roads has been constructed. Kampala is the commercial centre, and Entebbe the seat of government.

The total population of Uganda and Kenya is about

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6,000,000, including about 18,000 Europeans and 52,000 Asiatics. Uganda is the more densely populated. The imports of the two countries consist mainly of cotton and

textile goods, agricultural machinery and implements, tobacco, and foodstuffs. The chief exports are cotton (Uganda), coffee, sisal, maize, and hides.

The Eastern Horn of Africa. The whole region is physically a high plateau, rising to 8000 feet, with volcanic peaks of 15,000 feet, cut by the eastern rift valley which runs from the straits of Bab el Mandeb south-westward to Lake Rudolf. The line of the west coast of the Red Sea and the south coast of the Gulf of Aden, both fault lines, meet at right angles in Abyssinia, forming a triangular lowland. The river Hawash and Lakes Zwai, Shala, Abaya, Stefanie,

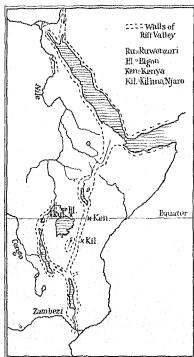


FIG. 211. THE GREAT RIFT VALLEY
Except for Ruwenzori the peaks shown are volcanic.

After Professor J. W. Gregory.

and Rudolf mark the course of the rift to Kenya.

North-west of the rift are the steep Abyssinian Highlands, and south-east of it the plateau sloping gradually to the coastal province of Italian Somaliland. To Italy also belongs the coastal strip along the south of the Red Sea known as Eritrea, while British Somaliland overlooks

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the Gulf of Aden. Between the two, opposite the Strait, is the small tract of French Somaliland.

In Italian Somaliland, the Juba and Webbe Shebeli river basins contain good pasture-land. Crops of durra, maize, and sesame are grown. Kismayu and the territory west of the Juba was ceded from Kenya in 1925. Kismayu and Mogadishu are the chief of several small ports trading in animal products, oil-seeds, gum, some cotton, and ivory. The traders are chiefly Arabs and Indians. The total population is about 1,250,000, including 1000 Italians.

In the British Somaliland territory, Berbera is the chief port with similar interests to the Italian ports. Like Jibuti, in the French territory, it has strategic importance, overlooking the important Red Sea route.

Abyssinia obtains its rain from south-west winds across Africa from the Atlantic. Rainfall is low, between 10 to 25 inches, occurring only in summer. The shortage of water, except on the high plateau, where 50 inches of rainfall is the average, is accentuated by the high temperatures. Along the coasts, which are dry and rather barren, the temperatures are between 70° to 80° F. in winter and 80° to 95° F. in summer, but height modifies these temperatures in Abyssinia. In the middle of the country is Lake Tana, the source of the Blue Nile. The summer floods of the swift-flowing rivers have carved out deep valleys, clothed with bamboo-forests and semi-tropical vegetation. The plateau is grass-covered, with patches of temperate woodlands. In the western province of Kaffa the coffee plant (hence the name) grows wild. Cotton, maize, and sugar grow up to 3500 feet; tobacco, wheat, and Mediterranean fruits between that and 7000 feet. Above that, barley and the hardier crops are found, but animal-rearing (mules and donkeys for transport, as well as cattle, sheep, and goats) is more important than agriculture.

The Abyssinians are a Hamitic race, professing Christianity. They produce little for the outside world, hides, skins, coffee, and ivory being exchanged for cotton goods

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and foodstuffs. The only railway runs from Jibuti, in French Somaliland, to Addis Ababa, the capital, 500 miles. All other transport is carried over poor roads by mules, donkeys, and pack-horses. One such route leads to Khartum, another from the capital to Massawa in Eritrea, a third to British Somaliland, and one along the rift valley to Lake Rudolf and Nairobi.

Abyssinia owes its independence, not to its lack of wealth, for there are undeveloped reserves of mineral wealth, but to its mountainous character and the difficulty of approach through deserts or forests.

The best part of the Italian colony Eritrea, on the Red Sea coast, is the pastoral district to the north. The southern portion is salt desert, with only scanty scrub vegetation. Asmara (15,000), the capital, is over 7000 feet above sea-level. Massawa is the port.

CHAPTER XXX

AFRICA—NORTH AND WEST

The Anglo-Egyptian Sudan. The Nile and its tributaries, covering four thousand miles between source and sea, alone make these countries habitable. This mighty river, flowing through a thousand miles of hottest desert, replenished by no rain, no tributary, and, more remarkable still, rising to flood at the time of the greatest heat, when it should dwindle and die, remained a mystery till the middle of the last century. No wonder the ancient race worshipped Ra, the sun-god, and the sacred water; no wonder the fellahin still think of the year in three seasons—the flood, the sowing, and the reaping.

The Nile system has been compared to a lotus plant—the delta forming the roots, the river the stem, and the upper tributaries and lakes the branching flower-heads. The sources of the Nile are threefold. The main source is Lake Victoria; the Atbara and Blue Nile come from Abyssinia and the Bahr-el-Ghazal from the Sudan region. Lake Victoria, fed throughout the year by equatorial rains, is the source of regular supply. The Nile is lowest in May, when it is almost entirely dependent on its equatorial supply. In the summer, as the rain belt follows the sun northward, the heavy rains of Abyssinia cause first the Sobat, then the Blue Nile, and lastly the Atbara to rise in flood. At Aswân the Nile begins to rise about June, and continues to do so, as each tributary rises in turn, till September. The dam at Aswân conserves and regulates this flood-water, but at Cairo, 550 miles to the south, the rising and falling takes place a month later. The difference between high and low Nile varies from twenty-five to thirty feet.

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Leaving Lake Victoria at a height of 3720 feet as the Kagera river, half a mile wide, the river descends northward over the Ripon Falls, through steep gorges, falling over the escarpment of the western rift valley at the Murchison Falls (1500 feet) to Lake Albert, at a level of about 2000 feet. Reinforced by its new supply, the river proceeds over rapids to the Sudan as the Bahr-el-Jebel, but between Lado, 5° N., and Khartum it falls only 200 feet. Flowing slowly, it widens out into great swamps, covered by reeds and matted vegetation called sudd. In one of these, called Lake No, the swampy Bahr-el-Ghazal joins it from the wet Sudan, and shortly after the Sobat from Abyssinia. Round Kodok, or Fashoda, millet (durra) and vegetables are grown on the mud flats. Khartum lies five hundred miles below this confluence. Below the confluence the rainfall rapidly decreases, and date-palms break the monotony of the grassland along its banks. The Blue Nile joins the White Nile amid cultivations of cotton and millet, dates, and melons. The last tributary, the Atbara, enters four hundred miles below Khartum. Between Khartum and Aswân the river falls 800 feet in 1300 miles, but there are six cataracts. At these cataracts the water is broken by rocks into countless rapids covering long distances, so that navigation is quite impossible, except in stretches between them. Below the first cataract at Aswân the Nile is navigable to shallow-draught vessels, and is confined to a narrow valley, only one to five miles wide, at the edge of which steep bluffs rise to barren heights of several hundred feet. Below Cairo the delta begins, the two main navigable distributaries being the Rosetta, leading to the west, and the Damietta, leading to the east of the delta.

The Sudanese are chiefly occupied with pasturing animals and growing food crops like durra along the river, and cotton along the Blue Nile below the new Makwar dam at Sennar. Ebony, rubber, and ivory are collected from the Ghazal region, the upper and White Nile. The

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most important export is gum, which is secreted by the thorny acacia-trees to resist drought, in the East Kordofan and the Blue Nile regions.

Khartum owes its importance to the routes which centre upon it. Railways run to Wadi Halfa, below the second cataract; to Suakin, on the Red Sea; up the Blue Nile to Sennar, and then across the river to El Obeid, in Kordofan. The caravan routes branch to Abyssinia and to Lake Chad. Khartum occupies a higher site on the right bank of the river than the old capital, Omdurman. Khartum is the centre for administration, agricultural research, and education.

Egypt. Egypt is just a green ribbon, a few miles wide, lying along the yellow sands of the desert. This used to be irrigated by dividing it into basins, supplied by canals. In flood-time—August—the water was admitted and covered the land several feet deep, depositing rich alluvium. After three or four weeks the surplus water drained back to the canal as the river falls. Winter crops were then sown.

Now great 'barrages' at Aswân, Esna, Asyût, and Zifta reserve the supplies from the regular flow, so that irrigation water is available all the year round. Maize and millet are the staple foods of the native, supplemented



FIG. 212. GUM-COLLECTING IN KORDOFAN

Sudan Government

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by beans, lentils, fruit (dates, figs, prickly pears), eggs, milk, and cheese. Tobacco and coffee are his luxuries; hashish his worst vice. A characteristic feature of the villages is the pigeon-cot, looking like a fortress, but built of mud. But the mosque is always the most imposing building. Trees are rare between Cairo and Aswân, except date-palms, every part of which is useful. The

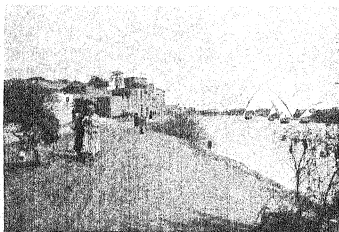


FIG. 213. A VILLAGE NEAR CAIRO, ON THE NILE, BUILT OF SUN-DRIED BRICK

Photo E.N.A.

trunk makes rafters for houses, the ribs of leaves, often fifteen to twenty feet long, make affass crates, which are used for every purpose; the leaflets make baskets, and the fruit provides food. The trees are beautiful at the time of harvest with their bunches of red or yellow fruit.

Two crops a year are always obtained, and sometimes even five or six. In winter, after the inundation, crops of wheat, barley, lentils, beans, and berseem (Egyptian clover) are obtained. In summer follow cotton, rice, sugar-cane, tobacco, and occasionally crops of maize and

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millet. Chisholm gives the following typical three-year rotation on the delta:

Cotton is grown from March to the end of October, and is immediately followed by clover, of which seven cuts are taken. In the next fifteen months, from July onwards, two crops of maize and one of wheat may be reaped, the wheat growing during winter and spring. The second crop of maize may be succeeded by clover, of which two cuts can be obtained before the ground is cleared once more, at the beginning of March, for cotton.

Cotton is the money crop. Egyptian cotton is almost like silk. It is a pretty crop, low green bushes looking something like raspberry-canecanes with large yellow flowers. The berseem, or clover crop, is even more striking. Animals are tethered while grazing it, and are tended by children. The beasts of burden include asses, the ox, the buffalo, the camel, and the womenfolk! Large numbers of poultry are reared in great incubators for egg production. As a result of having had their eggs hatched for

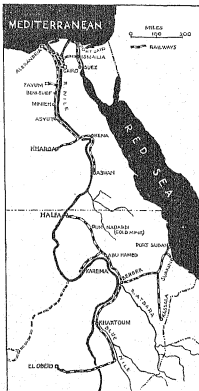


FIG. 214. THE NILE VALLEY

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them for thousands of years, Egyptian hens have lost all desire to sit and do not attempt it. But the eggs get smaller and smaller.

Many beautiful things are still made in Egypt. The three main classes are work in brass, gold, and silver, embroidery on net or cloth, and woodwork—carving and inlaying in walnut, etc., imported from the south. The bazaars have to be seen to be appreciated. In Cairo there are miles of wonderful alleys, lined with tiny, open shops, each trade having its own quarter. The only important manufactures for export are sugar-refining and cigarettes, the tobacco for which is imported from Turkey and Greece. Soap-making (from cotton-seed oil and soda from Wadi Natron), leather, perfumes, and pottery employ many people. Boat-building and navigation are said to employ more hands than any other calling, except agriculture. Fishing is a very considerable industry on the large lakes; for example, Lake Menzala. Factories for sugar-refining, cotton- and silk-weaving (silk imported), and paper-making are found in several of the delta towns, but Egypt depends for manufactured goods chiefly upon imports. Petroleum wells are worked along the Red Sea coast south of Suez, and at Suez the crude oil is refined.

The foreign trade consists chiefly of cotton, sugar, eggs, and onions, exported chiefly to Britain; and textiles, machinery, cereals, and coal imported chiefly from Britain. Nine-tenths of the trade passes through Alexandria, Port Said being chiefly a transit port for the Canal.

Alexandria (573,000), founded by Alexander the Great, stands on the west of the delta, where a sand-bar separates Lake Mareotis from the sea, just as the sand-bar at Port Said separates Lake Menzala. The harbour is protected by the island of Pharos, and eastward currents in the Mediterranean carry the Nile mud away from it. Cairo (1,065,000), at the head of the delta, commands routes southward up the Nile, northward to all parts of the delta, eastward across the isthmus of Suez for Syria and Meso-

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potamia, and south-westward to the oases. Cairo occupies the higher right bank, opposite the ancient capital Memphis. The Pyramids and Sphinx stand west of the river. It is naturally the great railway centre of the country.



FIG. 215. IRRIGATION IN THE NILE VALLEY

Note the circular threshing-floor.

Photo Will F. Taylor

The Nile valley and delta is the most densely populated part of Egypt. This is due primarily to its great fertility, but also to well-organized administration under British guidance. The population numbers about 15,000,000, half of whom live on the delta, where there are several large towns like Tanta (90,000), Mansura (64,000), and Zagazig (53,000). Outside the delta Asyût (57,000) and Faiyûm

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(53,000) are important irrigation centres and markets. Luxor (the ancient Thebes) is a very important tourist

centre near the valley containing the tombs of the kings, the temple of Karnak, and many other ruins of Egypt's ancient civilization.

The population is composed of a mixture of races. If we represent the Fellahin (probably the direct descendants of the ancient cultivators) by 40, the Copts (remnants of ancient ruling class) by 20, the Nubians (Berberine and Barbarians), originally slaves, by 5, Europeans, chiefly Greeks, Italians, British, and French, by 2, we get some idea of the proportions.

Originally part of the Turkish Empire, Egypt was declared a British Protectorate in 1914, but in 1922 this terminated, and Egypt is now ruled by its own king. But the new constitution does not affect the rights of Britain and other European countries secured by recognized treaties and customs.

The Suez Canal. The Canal, including the salt lakes through which it passes, is 103 miles long, with a minimum width of 150 feet and a depth of 33 feet. It is at sea-level throughout, and was built by Ferdinand de Lesseps, the French engineer, whose statue overlooks it on the

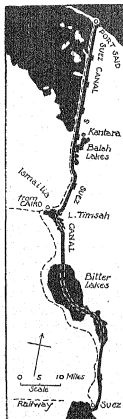


FIG. 216. THE SUEZ CANAL

Port Said breakwater. The approach from the sea at both ends is carefully marked out and protected, but ships must travel slowly, so that it takes on the average fifteen hours

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to go through. At night searchlights are placed on the bows of vessels, and lighthouses mark the course. The canal is widened at intervals, to allow passing, but one vessel usually ties up to the bank while the other goes by. Britain has a controlling interest in the Canal Company, and a few troops are kept to guard this vital link in imperial communication. About 6000 vessels and over 300,000 passengers pass through the canal every year, the dues for these transits amounting to £9,000,000.

THE ATLAS COUNTRIES

Algeria, Morocco, and Tunis are under French rule, the first being the richest and most developed. The north coast of Morocco belongs to Spain, and the port of Tangier, long ago British, is now under international control. Geographically the whole region is one, being dominated by the Atlas Mountains, which range from the Atlantic to Cape Bon in Tunis. They are a loop of the fold-mountain system of southern Europe, and consist of a series of parallel ranges, enclosing longitudinal valleys and plateaux.

The Great or High Atlas lie to the west, reaching over 15,000 feet in the highest peaks. To the east, two main ranges can be distinguished, the Maritime range near the Mediterranean coast, and the Saharan range to the south. Between them are enclosed plateaux, with numerous salt lakes, called shotts, in the lowest parts. Along the coast are low hills, and the belt of valleys between them and the Maritime range is known as the Tell. On the Sahara side of the south range the plateau falls rapidly southward. The climate is Mediterranean, the winter rainfall being plentiful along the coast, but diminishing rapidly inland. The summer drought is pronounced. Typical Mediterranean vegetation is found and the usual crops cultivated. From the mountains copper, iron, and phosphates are growing in importance as exports. Along the coast fisheries (sardines, tunny, and shellfish) are profitable.

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Algeria has nearly a million European settlers, and the number is growing. The Tell is the most fertile part. It was the granary of Rome, and the Tell has many ruins which recall its former greatness. The French have done much to restore its productiveness by constructing irrigation works, to guard against the great danger of drought. Wheat, barley, and oats are the chief cereals. The terraced lower slopes grow vines and limes and all the Mediterranean fruits, including olives. Tobacco and some cotton and flax are also grown.

The windward slopes of the main ranges are covered with forests of cork-oak, while in the plateau region of the shotts, where the winter rains are light, camels, sheep, and goats graze on the dry plants, and esparto or halfa grass is exported for paper-making in Europe.

From Algeria wine, wheat, and sheep are the chief exports. The coast towns and the Tell contain most of the population. Algiers (246,000) is the chief port and the seat of government. It is a railway centre for routes from the east and west of the Tell, and a difficult route across the plateau to the oases of Laghuat. Most of its trade is with Marseilles.

Oran is connected with Algiers by railway along the Tell, and with Fez, in Morocco, and has a line to the oasis of Colomb Béchar. Similarly, Philippeville is connected by rail to the oasis of Touggourt, through Biskra. These are the only railways to cross the mountains transversely and to enter the Sahara. Of the inland towns Constantine commands all the important routes of the Tell. The railway from Biskra passes through it *via* the famous gorge of El Kantara.

Tunisia is a French protectorate lying east of Algeria. Tunis (202,000), near the site of ancient Carthage, is well placed with regard to the strait between the eastern and western Mediterranean. It is an educational centre and the fortified capital of the native ruler. But its harbour is not a good one, for it is near the mouth of the river

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Mejerda, on a shallow lagoon, through which a deep channel has to be kept free for shipping. A railway connects Tunis with the southern ports Sfax and Sousa, and with Bizerta on the north coast. Bizerta has an excellent natural harbour. But Tunis is the chief outlet for the

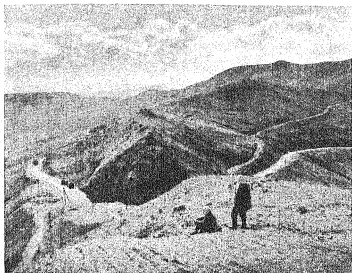


FIG. 217. ALGERIA: NEW MOTOR ROAD CROSSING THE ATLAS MOUNTAINS

This road passes between Algiers and Bou Saada at a height of 4000 feet.

Photo E.N.A.

fertile grain district of the Mejerda valley and for the wine, fruits, and phosphates of the whole country. Tunis has many Italian and French settlers.

Morocco has two coasts, the Atlantic and the Mediterranean. The Atlantic coast has a fringe of sand-dunes, behind which is flat lowland, from which terraces rise to the Atlas ridges. Numerous streams from the melting snows make the plains very fertile, for in parts there is deep black earth. There are olive- and fruit-trees in the

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north, and grain (barley, wheat, and maize) is the chief crop. The low hills provide pasture for cattle.

Population is distributed between the ports at the river-mouths and inland route centres. Except in the ports it is mainly native. Agadir, Mogador, Mazagan, Casablanca (chief port of Morocco), Rabat, Larache (serving the Spanish area of the Rif), and Tangier (mostly English trade) are all small ports on the Atlantic coast.

Casablanca (106,000) has displaced Tangier in importance, and now has twice as much trade as the latter. It is a coaling port and railway centre, and manufactures superphosphates brought from the hinterland. It deals chiefly with barley and flour, hides and skins, iron and phosphates, while Tangier is chiefly a fruit port.

Of the inland towns Fez (81,000) and Morocco City are picturesque old centres of government and trade, fed by well-established routes. A railway joins Fez to Rabat and Casablanca, and *via* Tlemsen to Oran and Algiers.

The Mediterranean ports of Ceuta, Tetuan, and Melilla are of small importance, as most of the trade of east Morocco goes to Oran. Poultry-keeping has become important, and eggs form one of the chief exports. Most of the products naturally go to France, and the sugar, cotton goods, and machinery which are imported are French.

LIBYA¹

This Italian province has a population of nearly a million, including about 30,000 Italians. In Tripoli, the African plateau approaches to within fifty miles of the coast. Farther east, in Cyrenaica, the plain becomes much broader, and is below sea-level in parts. The whole coast is too far to the south to get much rain or to attract Mediterranean shipping. But routes across the Sahara are shorter as a compensation. Temperatures are higher than in the Atlas countries, but the crops and occupations

¹ The official Italian spelling is Libia.

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are similar. The chief value of this territory lies in its Saharan trade. From Tripoli caravan routes start for (1) Timbuktu *via* the oases of Ghadames, Tuat, and Taodeni; (2) Nigeria (Sokoto and Kano) *via* Ghadames, Ghat, and Agades; (3) Lake Chad (Kuka) *via* Sokna, Murzuk, and Bilma, with branches from Murzuk to the capitals Abeshir, El Fasher, and El Obeid, of the Sudan districts Wadai, Darfur, and Kordofan respectively; (4)



FIG. 218. THE SAHARA

Cairo *via* Sokna, Aujila, and Siwa, and so on to Suez for Mecca. Benghazi, the eastern port, is also fed by caravan routes from the Wadai *via* Kufra and Aujila. Both ports have short railways between the port and the more distant fruit plantations.

The Sahara is a rugged, undulating area, far from flat, and mainly rocky except in the east, where sand predominates. The oases in the Sahara vary considerably in size. Some are merely a single well surrounded by a few palm-trees, some cover many square miles. Many of them stand high, some 2000 feet above sea-level, the only essential being an impermeable strata underlying the porous top covering, collecting and retaining, as in a saucer, any rain which falls over a wide area. The usefulness of the date-palm has already been referred to. In

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the oases they constitute the chief form of wealth, for once established they reach moisture for themselves, and although land is held in common, there are very definite restrictions as to the planting of fresh trees likely to encroach on the water-supply of those already planted. Only the owner of the outside trees may add to their



FIG. 219. PART OF AN OASIS ON THE EDGE OF THE SAHARA
DESERT

By courtesy of the Compagnie Générale Transatlantique, Ltd.

number within a given distance. Water for other plants, for human and animal needs, must usually be hauled from the well. If shallow—as, for example, in Kufra, where the depth is only nine feet—this is done by the *shadûf*, as in Egypt. If deep, it is hauled by a rope over a pulley. Every drop is precious, and great care is taken to avoid any waste. Sometimes, when the oasis is situated at the foot of rocky cliffs, water flows over the surface of an oasis, as at Tafilet, which covers 400 square miles.

On the large oases, where settled conditions prevail,

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there are considerable cultivations of corn, vegetables (especially onions), fruits (the melon and orange), and cotton. There is sufficient water also for pastures for flocks of sheep and goats, as well as camels and horses. It must be remembered, too, that on the edges of the desert sparse vegetation occurs, and increases gradually toward the rainy districts. These desert plants may be prickly, tough, or gummy, but the camel's mouth is well



FIG. 220. ARAB HOMES IN THE DESERT

Photo E.N.A.

fortified to overcome such difficulties. He is a wonderful example of nature's equipment to fit him for his surroundings, with his broad, expanding toes, his hump, for accumulating reserves of fat, and his water-storing stomach, but his qualities must not be exaggerated. He needs careful preparation, watering, feeding, and rest before a long journey, and he must not be overloaded. But he will carry 300 lb. for up to thirty miles a day. The camel repays any care taken of him, for some carry burdens and some are fleetier than a horse. Camel's milk is rich and nourishing, and the coat of the camel has many uses.

Desert peoples may be either nomadic, living in tents,

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moving from well to well with small flocks of sheep and goats, or settled on an oasis. The former carry on the caravan traffic. Caravans make great use of the wadis, which are deeply cut watercourses with almost vertical sides, the work of periodic thunder rains. Water of a kind can usually be got at by digging in the floor of the wadi. There is danger of meeting a rushing torrent from a storm which has occurred at a distance out of sight or hearing. The settled desert-dwellers try to save as much of this storm-water as possible, by carefully constructing dams here and there. The latter live in dome-shaped stone houses, built in villages amongst the palm plantations and defended by walls. For the nomads are often a fierce and desperate people. But more often the caravan is welcomed as an opportunity of getting by exchange some luxury of food or dress otherwise unobtainable. Their diet and life, however, is at all times much richer and more varied than that of the nomad.

The greater part of the Sahara, except Libya and the Anglo-Egyptian Sudan, is under French rule, but a small section in the west, Rio de Oro, is Spanish.

THE SUDAN AND WEST AFRICA

South of the Sahara the Sudan extends right across the continent. The eastern section has already been noted in connexion with Egypt. The remainder is usually divided into the central Sudan (between the Nile and the Niger) and the western Sudan of the Niger basin.

The Sudan is a transition area lying approximately between latitudes 10° and 20° N., being semi-desert and pasture-land in the north, park-land or savanna with extensive agriculture in the centre, while toward the south trees increase in number and size, merging gradually into tropical forests. The central districts of Kanem, Bagirmi, and Wadai are French, but Nigerian Sudan is partly British.

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The animals of the pastoral areas include asses and camels, as well as horses, cattle, and sheep. As in the steppe lands, the tribes move from place to place according to the abundance of grass. When it is good, they remain for some time, and build a stockade, into which the animals are driven at night for protection from beasts of prey. Inside this stockade large, roomy, but ill-ventilated huts are built of bamboo, covered with hides or grasses.

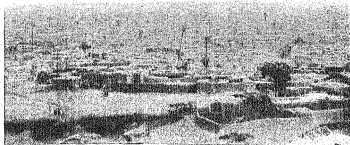


FIG. 221. KANO

Photo E.N.A.

But wherever the summer rains are sufficient agriculture is increasing. Useless trees are cleared, a few being left for shelter or for their oil products. Maize, millet, various vegetables, and cotton and tobacco are the usual crops. Here, too, are practised those arts of weaving, iron-working, leather-making, and pottery referred to above. Such a life renders settled communities in protected towns possible and necessary. For in the past, as in all such marginal regions, the more prosperous agriculturist was liable to be raided by the fiercer desert nomads. Timbuktu near the Niger, is one of the most famous of these towns. Here routes converge from the upper and lower Niger, from Senegal in the west, and from Morocco and Algeria

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across the desert. In the markets are exchanged the ivory, rice, leather-work, nuts, and other forest products for the tools, tea, salt, and sugar brought from the north. Sokoto, Kano, and Kuka, in British Nigeria, are similar towns, all protected by thick, sun-baked mud walls, often forty feet high. The Niger rises in the Futa Jallon Highlands, where also the Gambia and Sierra Leone rivers rise. It flows for a thousand miles, through forests and savanna, to the desert at Timbuktu, and then, bending southward, over the savannas of northern Nigeria by the Busa rapids to enter its unhealthy delta, low, densely forested, and fringed with mangrove swamps. Like the Nile, it has long navigable stretches. But, unlike the Nile, it only skirts the desert, and instead of leading to a densely populated delta, in touch with the great markets of Europe, its upper valley is completely shut off.

The territories round the coast have the typical African relief—a coastal lowland, with terraced highland inland. Most of them are little more than the river basins behind the original trading posts. There is a marked seasonal (monsoon) variation of wind—usually south-west, but changing to north-east in the dry season, November to February. The whole coast is subject to heavy surf, which builds up sand-bars at the river mouths. As a consequence there are few harbours. This adds importance to the best of the harbours—viz., Freetown, in Sierra Leone, and Lagos, in Nigeria, both British.

The map shows that the French area is much more extensive and united. But the British colonies are more developed at present, and therefore more densely populated. As a consequence the output of both crops and minerals is greater in the British area. But it is not a land for the white man. Europeans have to take great care of their health by living wherever possible on the highest parts and taking long holidays in Europe periodically.

The wealth of the region lies chiefly in the plant products; for example, from Nigeria, typical of them all, the chief ex-

AFRICA—NORTH AND WEST

ports are palm kernels (£4,300,000), palm oil (£3,700,000), ground-nuts (£2,400,000), cocoa (£2,300,000), tin ore (£2,250,000), cotton (£550,000), and hides and skins (£1,000,000). Note that palm products exceed all the others together in value. It is necessary to understand why these crops are so valuable. The oil-palm grows wild

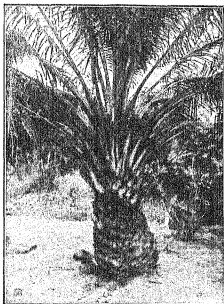


FIG. 222. THE OIL-PALM

in West Africa within ten degrees of the equator, but extensive plantations are cultivated. Oil is obtained both from the fibres surrounding the kernel and from the black kernels themselves. It was used originally chiefly for soap- and candle-making, but now for margarine and other manufactures. Liverpool and Marseilles are the chief markets for these products. The cacao-tree, which must not be confused with the coconut-palm, can be grown

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within twenty degrees of the equator. It does not like wind, requires plenty of heat and moisture, and a deep soil, so that it does best in the lowlands. It also needs shelter from direct sun. As the rubber-tree requires similar conditions, it is grown to provide the required shade. The fruit contains thirty to fifty cacao-beans. These are fermented for several days and then dried in the sun, to remove the bitter flavour and stop germination. From the nuts the fat known as cacao-butter is extracted, the remainder forming the cocoa-powder. Nearly half the world's supply comes from British West African colonies, chiefly from the Gold Coast. Ground-nuts (monkey-nuts or pea-nuts) are the fertilized blossoms or seed pods of a small creeping plant which are forced into the soil to ripen two or three inches below the surface. These will grow even outside the tropics, and do well in poor sandy soils where other crops would fail. They, too, yield excellent oil for food purposes. But they are increasingly eaten themselves, by both the native and white people. They are also used for fodder. In Gambia they form the bulk of the exports. Kola-nuts are much valued by the natives. They contain drugs which stimulate the nerves and help to prevent fatigue. They are imported into the Gambia and exported from the Gold Coast and Sierra Leone, where their cultivation is important. The Sudanese consume large quantities, although the cost of transport is very high. The coconut-palm yields the copra which is one of the exports of Ashanti. Copra is the name for the dried kernels of the coconut-palm. This tree grows in hot lands, but best near the sea. Like the date-palm, almost every part is useful. The kernel, the juice, the coir, or fibre, and the timber are all used in commerce.

British West Africa consists of four colonies and protectorates, each isolated among surrounding French territory. The total area is about four times the area of Britain and the population numbers about 24,000,000 people. Much is being done to educate the natives.

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The **Gambia**, which is the nearest British possession in Africa, was also the first trading-station in this part. The boundary follows the river at a distance of about six miles from each bank for nearly two hundred miles. The river Gambia constitutes the highway, and there is no railway. But the French railway from the coast of Senegal to the Sudan is at no great distance. Bathurst, on an island at the mouth of the river, is the administrative centre and port. Trade consists of imports of cotton goods, rice, and sugar, and the main export is ground-nuts. Palm-kernels and hides are subsidiary products.

Sierra Leone. As the coast faces south-west and the interior rises to a height of 6000 feet, the colony is subject to heavy rain in the rainy season, May to October. The oil-palm grows wild and palm-kernels form the chief export; the production of palm-oil itself is at present poor. Kola-nuts and piassava (stiff and wiry palm strands used for making brooms, brushes, etc.) are next in importance, and increasing attention is being paid to the production of ginger. Freetown, having the best harbour along this coast, is an important port of call for coal and water. A narrow-gauge railway (227 miles long) connects Freetown with the interior.

Gold Coast, including Ashanti and the Northern Territories. The valley of the Volta river, with the Black Volta crossing the centre of the colony from the west, is an important physical feature. The highlands to the west and south are the more densely populated parts. Rainfall is light, except on the highlands. The wet forest areas contain mahogany and kola trees. Some rubber is also obtainable, but the production has declined. The shea-tree, which is much valued for its oil-yielding milk, grows in the savanna forest to the north. The successful crop is cocoa, the production of which has increased from 80 lb. in 1891 to over 235,000 tons in 1929. A great development of motor roads (5000 miles) has taken place to facilitate the transport of the cocoa. Kola-nuts, palm-nut kernels, and

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copra are other exports. The export of gold, diamonds, and manganese exceeds in value £600,000 in each case.

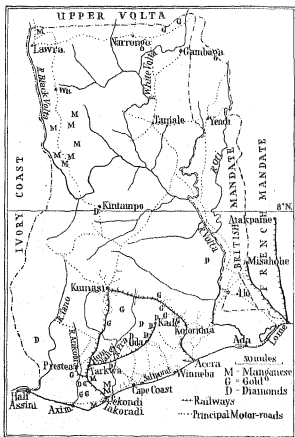


FIG. 223. THE GOLD COAST: MINERALS AND COMMUNICATIONS

Based on a Gold Coast Government map

Experiments are being made with the cultivation of sisal and cotton. Britain sends more than half the imports,

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consisting of cotton, iron, and steel goods, etc. Tobacco is imported from the United States, which share with Germany, Holland, and France a large proportion of the trade. The coast has no estuaries, and heavy surf impedes shipping. Breakwaters afford some protection at Accra and Sekondi. But a new harbour has recently been constructed at Takoradi, near Sekondi. There are five hundred miles of railway connecting Accra, Sekondi, and Takoradi to Kumasi, the road centre of Ashanti.

The portion of Togoland, once German, now administered by Britain under mandate, has characteristics and trade similar to those of the Gold Coast.

Nigeria. This important colony is three times the area of Britain, and has a population of nearly 20,000,000, including 6000 Europeans. This density of population is not equalled by any other country in Africa. The tribes in the south are of negro race, but the northern tribes have Hamitic characteristics. The river lowlands of the Niger and Benue trisect the country into highland blocks. Both rivers are navigable above the delta for several hundred miles when in flood. Heavy rain falls along the coast and on the eastern highland, but decreases northward. The coasts and delta are fringed with dense mangrove swamps, succeeded inland by rain forest, and that in turn by savanna forest. Finally the forest changes to thorn-woods and semi-desert. These forests yield respectively tannin and logs; mahogany, ebony, and rubber; shea-butter; and gum. Palm oil especially and kernels are again the leading productions. The amount of cocoa produced has rapidly increased and now approximates 55,000 tons a year. Cotton is widely grown in the belt south of Kano. The northern tribes are also keepers of cattle, sheep, and goats, the hides and skins of which are tanned, dyed, and exported. The chief mineral products are coal of poor quality from the southern district, and tin from the Bauchi plateau. There are nearly 2000 miles of railway and numerous motor roads. The main lines are from

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Lagos to Kano (704 miles) and Port Harcourt to Kano (560 miles). Kano (100,000) is the great native walled



FIG. 224. TAPPING A RUBBER-TREE

Photo E.N.A.

city famous for hundreds of years as a market for cotton, hides, and skins, as well as salt. Lagos (40,000) is the capital and port. The usual sand-bar has been cut, giving access to its lagoon harbour

Liberia is a negro republic, which began with slaves

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freed in 1822. Although the country is forested and possesses mineral wealth, the products mentioned under Sierra Leone are the only exports. Monrovia is the capital. Its harbour is to be improved and a short railway to be built. But practically all transport is by portage in the absence of roads, railways, and navigable rivers.

The French coastal possessions of Guinea, the Ivory Coast, Dahomey, and the mandated portions of Togoland are extensions of the savanna into the forest belt. The relief, climate, and productions are therefore similar to those of the adjoining British colonies, but development has not advanced so rapidly. In French Guinea the export of bananas is growing. Konakri serves as a port and administrative centre, and is connected by railway to the Futa Jallon Highland and the upper Niger. The Ivory Coast is administered from Bingerville, and Grand Bassam is the port, with a big trade in mahogany. Timber is floated down, but a railway is being pushed back to the Kong territory in the highland. The term 'ivory' has no significance other than historical. The trade of Dahomey is practically similar to that of the Ivory Coast, although only a third of the size. The natives, who are pure negroes, till the land well, and considerable expansion in production is probable. Porto Novo is the chief centre. The natives of French-mandated Togoland are Bantu in the south, but Hamitic in the north. They cultivate maize, yams, etc., and barter with the factories in palm oil and kernels, copra, and some rubber obtained from the forests. Cacao and cotton cultivation is being developed. At the port of Lome there is a cotton-ginning factory. There are three railways (total mileage 204 miles), which radiate from Lome.

Portuguese Guinea is little developed, except along the coast. The chief settlement is Bolama, on the island of that name near the coast.

The Cameroons and Gabon. The Cameroons are nearer to the equator, and get heavy rainfall, particularly in the

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north, where the flanks of the Cameroon Peak present an elevation of 13,000 feet to the moisture-laden south-west winds. Here the rainfall is over 400 inches, and may be compared to that at Cherrapunji in Assam, the wettest place in the world. This, combined with high temperature, produces dense forests up to 7000 feet, with savanna above and on the interior highlands. Duala is the port and Yaoundé the Government centre. Tobacco, palm oil, cacao, timber, and ivory are the products. The Cameroons are administered by France under mandate from the League of Nations. In the Gabon Colony of French Equatorial Africa, Brazzaville, on Stanley Pool of the river Congo, is the chief inland town, and Libreville the port capital. A railway from Brazzaville to Loango (Pointe Noire) is being completed.

Spanish Guinea (the territory round the Rio Muni) has its capital on the island of Fernando Po. The country is heavily forested. There is a small production of cacao, coffee, and bananas, but there is no real harbour, and rivers are not accessible for ships. Fishing is the chief occupation. Fernando Po and Annobon are like the Portuguese islands of Sao Thomé and Principe, extensions of the volcanic ranges of the Cameroons. Rich soil and abundant heat and rain make them all highly productive of cacao, coffee, vanilla, and quinine, but the Portuguese islands are the more important.

The Congo Basin and Angola; the Belgian Congo. Lake Bangweulu collects the headwaters of the Congo. Leaving the lake, the river, already as large as the lower Thames, falls 700 feet to Lake Mweru. Later the Lukuga, from Lake Tanganyika, in the wet season only, and other rivers from the Lake plateau continually swell its volume, till it tumbles down the Stanley Falls to a lower level. Flowing majestically, miles wide for 1000 miles across level forested country, it receives great tributaries like the Ubangi from the north. The river is the home of the hippopotamus and crocodile. Before descending from the

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plateau, it receives also the collected waters of its southern tributaries, including the Kasai. The 900 miles between Stanley Falls and Stanley Pool are navigable, and so are many of the tributaries. In descending the 1000 feet to the sea it rushes, now madly, now swiftly, but sometimes steadily over a distance of 200 miles, to plunge at last over the Yellala Falls, and complete its last 110 miles placidly to its estuary. There is no delta, for Stanley Pool acts,



FIG. 225. CONGO VILLAGE
Union Castle Line

like all lakes, as a filter. The importance of the Congo and its tributaries for transport may be gauged from the fact that there are 270 steamers and nearly 500 barges in use between Leopoldville and Stanleyville.

The potential wealth of the region is incalculable. The value of the trade of the colony is twice that of the year 1913. At present copper, gold, diamonds, and tin from the Katanga, in the extreme south, form the most valuable exports. Palm oil, rubber, ivory, and copal (gum) from the forests come next. There are great difficulties of transport, but the use of trained elephants, buffalos, and

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even zebras is proving a success. The natives grow many crops, such as rice, bananas, etc., for their own use, and there are plantations of cotton, cacao, and all the tropical plants. In the Ruanda region, acquired from German East Africa, a dense native population graze over 2,000,000 cattle.

Railways link Lake Tanganyika to the Congo (Albert-



FIG. 226. COCONUT-TREES BY THE RIVER CONGO

Photo E.N.A.

ville to Kabalo) ; Bukama (in Katanga) to Cape Town and Beira ; and Matadi, at the head of the estuary, to Leopoldville on Stanley Pool. Leopoldville will probably soon be linked to Bukama *via* Ilebo, on the river Kasai, the present terminus. There is great competition for the traffic from Katanga to the ports, and railways are being rapidly built. Most of the copper at present is exported through Beira, and some through Dar-es-Salaam. The route between Katanga (Chilongo) and Benguela (Lobito Bay) through Portuguese West Africa is already completed. Other

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routes under consideration are Stanleyville to the White Nile at Rejaf, with a branch to the Mombasa line. Boma, the Congo port, handles the trade in crops and forest products.

Angola, the largest of Portuguese possessions, has, in contrast to Belgian Congo, a thousand miles of coastline.

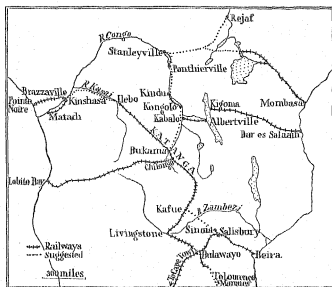


FIG. 227. RAILWAY RIVALRY IN CENTRAL AFRICA

Fishing is important, and dried fish are exported. Mangroves fringe the northern part of the coast. The coastal plain, some fifty miles wide, has a moderately warm, rather dry climate, tropical heat being modified by the Benguela Current. Forest is found only in the north, the rest of the country being savanna land, which becomes first scrubland and then desert to the south. The land rises in terraces to the highlands, where cattle-rearing and sheep-grazing are important. Agriculture is being

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encouraged, the successful crops being maize, tobacco, sugar, and cotton. Coffee, maize, and oil-seeds are sent chiefly to Portugal, and textiles are imported. Loanda, in the north, is the chief port and Government centre, with soap and tobacco factories. Benguella, with the fine natural harbour of Lobito, serves the centre and Mossamedes the south. Railways run to the interior from Loanda for 280 miles; from Benguella for 842 miles to the Congo frontier, with connexion to Chilongo, and from Mossamedes for 155 miles, the last collecting hides and skins, sugar and cotton for export. In addition there are 18,000 miles of roads.

The volcanic **Canary Islands**, between latitudes 27° and 30° N., all have steep and rocky coasts rising to high cone-shaped mountains (Peak of Tenerife, 12,152). Altitude and influence of sea moderate the high temperatures, so that the islands are famous health resorts on account of their warm, equable climate. The vegetation is rich, and bananas, vines, and other fruits, cereals, coffee, and tobacco are cultivated. Fishing and lace-making are important occupations. Santa Cruz is a coaling station and, like Las Palmas, a port of call for South African liners.

The Portuguese **Cape Verde Islands** are also volcanic. Their name is not due to the green vegetation, for they have a much drier climate, but to the seaweed which drifts thither. St Vincent is an important coaling station for South American shipping. Coffee and medicinal drugs are the products.

The **Azores** and **Madeira** are also Portuguese; both lie in the track of important air and sea routes. Funchal (25,000), on Madeira, is a port of call for South African and South American liners. Both groups grow fruits, and are considered part of the republic of Portugal.

The British island possessions of **Ascension**, **St Helena**, and **Tristan da Cunha**, all south of the equator, are also volcanic cones. Ascension has only 250 inhabitants. It

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is famous for turtles; and guano is collected. St Helena is an important cable station. Linen and lace-making from home-grown flax, fruit-growing, and cattle-rearing are carried on, but few vessels call, and markets are far away. Tristan da Cunha is a lonely, inhospitable group of very small islands, with a handful of people, who have to struggle to maintain food-supplies.

The east coast British islands are Mauritius, the Seychelles and Chagos groups, Zanzibar, and Pemba. The last have already been referred to. Mauritius has great strategic and historic importance, being centrally placed between South Africa and India as well as Aden, Singapore, and Australia. It is important to notice how many of these countries surrounding the Indian Ocean are under British rule. Port Louis and Grand Port are naval coaling-stations. Being in the track of the south-east trades, the climate is hot and wet, so that rich crops of sugar-cane, coconut-palms, and vanilla are obtained. The population is nearly 500,000, mostly Indian, and the exports chiefly sugar.

The Seychelles and Chagos groups, which lie 900 miles to the north, also produce coconuts, vanilla, and guano, and both are used as coaling-stations.

Madagascar and the Comoro Islands. Madagascar is an important French possession, nearly 1000 miles long, about 200 to 300 miles wide, separated from the continent by the Mozambique Channel, 240 miles wide at its narrowest. It is thus one of the world's largest islands. In structure it is a faulted crystalline plateau, with volcanoes forming high cones. The plateau presents a steep face eastward, with an average height of over 4000 feet. It is probably a remnant of great table-lands which once united Africa and the Deccan. Lying across the track of the trades, the high east coast receives a rainfall of over 100 inches annually. The west coast being low and in the lee of the winds gets less than half this amount, and the south-west is distinctly dry. Thus on the east coast

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tropical forests, containing ebony, rosewood, etc., are succeeded inland by savanna land, becoming scrub in the south-west. The population is over 3,500,000, and is mostly composed of natives, not of African but Malayan origin. There are several considerable native towns. The capital, Antananarivo, occupies a central position, and has a railway (230 miles) to the chief port, Tamatave. Diego Suarez, in the north-east, is an important naval station. Cattle-breeding and agriculture are the chief occupations. Over 1,250,000 acres are under rice. Manioc, maize, sweet potatoes, coffee, butter-beans, sugar, and cotton are also cultivated in large quantities. Vanilla, grown in the north-west, is one of the most valuable exports. Silk- and cotton-weaving, the preparation of hides, foodstuffs (tapioca, sugar, and meat extracts), and of gold, graphite, and mica for export is being organized by Europeans, mainly for French markets. Some coal is also found. The trade of Madagascar exceeds in value that of Mauritius and Reunion combined.

French Reunion, 400 miles to the east, with an area of nearly 1000 square miles and a population of nearly 200,000, has a climate and productions similar to those of Madagascar.

CHAPTER XXXI

AUSTRALIA

AUSTRALIA is geographically one of the oldest lands, but it is the home of one of the youngest nations. The peculiarities of its animals and plants bear witness to its long isolation from the rest of the world. Being an island, and lying far to the south of the great sea highways to the East Indies, both the Portuguese route round the Cape of Good Hope and the Spanish route from the Pacific, it remained neglected, in spite of early Dutch pioneers, till, in 1788, the first settlers planted the Union Jack on the shores of Port Jackson.

But for a long time the steep escarpment of the Blue Mountains proved as great an obstacle as the Appalachians did in North America. By 1850 the whole eastern coast, the southern plains, and the coastal plain of the west coast had been explored. As in Africa, the high desert in the west and the type of river discouraged penetration. But the vital factor was, and still is, the rainfall. Experience proves that close settlement needs a rainfall of not less than 15 inches. Nearly half of Australia gets less than this. Irrigation can do, and has already done, much, but sheep-pasturing is the only occupation (apart from the special case of gold-mining) that can be followed inside this area, and the 10-inch isohyet practically marks the limit of that.

The area of Australia is nearly as great as that of the United States, is four-fifths that of Canada, and three-quarters that of all Europe. The population of the continent is now about 6,500,000. This is about the same as that of the United States a century ago. Nearly half of the total population is to be found in the six largest

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cities of the Commonwealth. As we have seen, 90 per cent. of the population of the United States to-day lives in the eastern half of that continent, where the rainfall is over 20 inches. In Australia the area so blessed is much less, and much of it is tropical, where the suitable crops

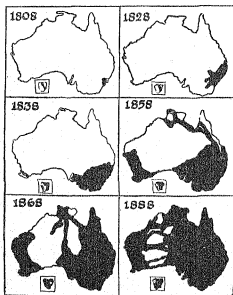


FIG. 228. PROGRESS OF AUSTRALIAN EXPLORATION

are cotton, rice, and sugar. These require labour at low cost such as coloured races provide. The only natives in Australia are the aboriginals (about 60,000, but diminishing), and they are a very primitive type, leading a nomadic life and not inclined to settled occupations. Australia has firmly decided to exclude all coloured immigrants, and even other non-British peoples, so that the aboriginals, and the Chinese, Japanese, and Europeans other than British (chiefly German) already in the country number together

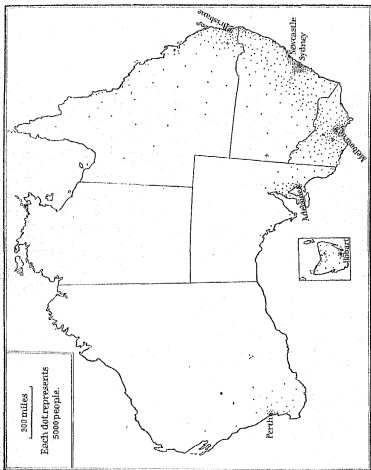


FIG. 229. AUSTRALIA: DISTRIBUTION OF POPULATION (1921 CENSUS)

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only 250,000. Thus 96 per cent. of the Australian people are of British stock, and the small proportion of other Europeans are strongly Australian in sentiment. Australia is therefore almost free of the problem that is found in Africa, of native races. It has the advantage of being

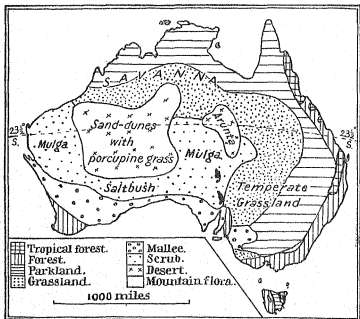


FIG. 230. AUSTRALIA: NATURAL VEGETATION

Based on Griffith Taylor and A. V. G. James

under one Government—the Commonwealth—set up in 1901, and the physical and climatic features of this island continent enable us to treat it much more as a unit than the other continents.

Physical Features. The three simple physical divisions of the continent are:

(1) The western half of the continent—a plateau of

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ancient crystalline and sedimentary rocks mostly about 1200 feet high and highest along the centre, where it rises to over 4000 feet. It generally slopes down steeply to a narrow coastal plain.

(2) The central lowlands, where the underlying rocks are younger and softer, being of Cretaceous and Triassic age, with great areas of alluvium. They consist of (a) the Lake Eyre basin (where the lowlands are nearly 1000 miles wide), (b) the Murray-Darling basin, and (c) lowlands round the Gulf of Carpentaria.

(3) The eastern highlands, largely composed of Carboniferous and igneous rocks. The main divisions are (a) the Bellenden Ker Range of North Queensland, over 5000 feet, (b) the New England Range and Blue Mountains of New South Wales, (c) the Australian Alps of the south with Mount Kosciusko, 7328 feet, and (d) the mountains of Tasmania.

Climate. The north part of Australia has a monsoon climate, for when it is winter over south-east Asia the sun is overhead in north Australia. When, therefore, the winds are outflowing from Asia, they are moving inward in Australia, to the low-pressure system over the heated desert. Conversely, in the Australian winter, the winds are outflowing and dry, while in Asia where it is summer they are inflowing and wet. The summer monsoon rains reach far to the south over the lowland plains, but rainfall diminishes rapidly from the coast inland. The centre and west of the continent receive rain only occasionally, and then in the form of heavy thunderstorms, which are often destructive. The south coast is mainly dry in summer.

Along the east coast, where the highlands lie transversely in the track of the south-east trade-winds, abundant rain falls. Here too the quantity diminishes steadily inland, for trade-winds are dry winds unless cooled by forced ascent. Thus rain is confined chiefly to the north, east, and south coasts—the north receiving summer mon-

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soon rains, the east rain at all seasons with a maximum in summer or autumn, and the south winter rains. The west coast gets little except south of Perth, where the westerlies strike it in winter.

Comparing Australia with Southern Africa we must note that (a) the area of winter rains is larger in Australia and the rainfall more. In South Africa, winter rains are confined to the south-west area from north of the Cape Town peninsula to Port Elizabeth. In Australia adequate winter rains occur in the area south-west of a line joining Geraldton to Albany, some light though reliable rain along a narrow strip of the coast of the Great Australian Bight and in south-east Australia—*i.e.*, a great part of Victoria and the whole of Tasmania. Thus both Cape Town and Perth receive 18 inches in the winter months of June to August, but Perth gets 10 inches more in the year. (b) In the trade-wind area the rainfall is heavier in Australia than in Africa. Thus Aliwal North (30° S. 27° E., altitude 4300 feet) in South Africa receives 26 inches annually, nearly half in summer, while Tanterfield in Australia (29° S. 152° E., altitude 2800 feet) gets 31 inches, of which only one-third falls in summer. But rainfall decreases inland more rapidly in Australia; thus Mafeking has 30 inches, while Bourke has only 15 inches.

The north of Australia is equable but rather hot (over 70° F.) throughout the year; the south is cool in winter, with snow on the eastern mountains, and warm in summer; the interior has both daily and annual extremes, but these extremes are less than those of North Asia or North America. In summer the hottest part (over 90° F.) is in the western desert; along the south coast temperatures are about 70° F. In winter the average temperature of the south and south-east is about 50° F. Isotherms for intervening temperatures at both seasons curve roughly parallel to the coasts.

Natural Regions. The combination of relief and climatic features enables us to distinguish 'natural' regions

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in which conditions of life vary in accordance with natural resources. These regions range themselves more or less concentrically round the dry interior as follows: (1) The arid region of the centre and west; (2) the savanna and steppe belt; (3) the tropical forest belt of the north and north-east coasts; (4) the south-eastern highlands and coast; and (5) the southern regions of winter rains.

(1) **The Arid Region.** This stretches from the west coast at the tropic for 1000 miles to the east, and extends for about half that distance toward the south coast, and therefore covers half the continent. It was naturally the last to be explored, most of it not till within the last half-century. Isolated hummocks of spinifex diversify a waste of sand and rocky ridges. Unlike the Sahara, there are no oases, though wells have been sunk which yield a limited and uncertain supply of water. The Macdonnell Ranges collect some rain, which finds its way to Lake Eyre. But 'Lake' Amadeus is merely a bed of salt. Around the edges between the desert and the grasslands, where rainfall averages 10 inches a year or more, salt bush, mulga (acacia), and prickly grasses grow. The whole region is one formed of very old, hard rocks, schists, and gneiss which have been planed down through the ages, mainly through wind erosion. In certain areas, however, valuable minerals are found; for example, around Coolgardie.

(2) **Savanna and Steppe.** To the north around this arid region is a semi-circular belt of savanna land and steppe. (a) West of Cambridge Gulf the savanna land extends to the coast. Eastward, however, the coastal area is clothed with tropical forest, and the edge of the savanna belt follows the coast at a distance roughly parallel to it of about 100 miles. Rainfall increases outward from 10 to 50 inches on the coasts, and falls in summer. The average temperature is always over 60° F. These are typical savanna conditions (*cf.* Sudan). On the coastal side of the savanna in the north thorn-woods and plantations of acacias and

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eucalyptus become more numerous. Successful agriculture is not yet possible. The only industries therefore are gold-mining, as in the Kimberley district, cattle-rearing along the upper river valleys (Victoria, Daly, and Roper rivers), and collecting pearls along the coast. The northern half of the central lowlands is included in the savanna belt. The higher temperature and heavier rainfall toward the



FIG. 231. YOUNG MANGROVES COLONIZING A CAY, HOPE ISLANDS

Photo by M. A. Spender and J. A. Steers, Great Barrier Reef Expedition

Gulf of Carpentaria provide pasture for millions of cattle and sheep. This too is the largest of the artesian areas in Australia.

(b) On the lowlands drained by the Darling and its tributaries the grasslands have more the character of steppe. The area is mainly devoted to sheep pasture, but cattle are grazed nearer the moister highlands, and wheat is grown under irrigation near the Darling Downs.

The lower basin of the Murray-Darling is shut in between the Flinders Range on the west and the Blue Mountains on the east. As a result, the western part is

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deprived of much of the rain brought by westerly winds in winter, and the eastern part of the summer rain from the trade-winds. In the north and west of the basin rainfall is light, and the rivers run only in the wet season, and then into salt lakes, but artesian water is available. The artesian wells of this area are described later (page

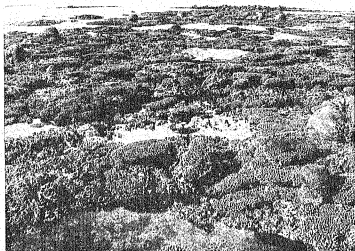


FIG. 232. TYPICAL SURFACE OF THE GREAT BARRIER REEF

By courtesy of the Development and Migration Commission, Commonwealth of Australia

550). But the Murray system is fed by snows of the Australian Alps, so that irrigation is possible, particularly in the Riverina district of the south. This is therefore one of the natural grassland areas of the world, but irrigation in the south has made possible also wheat- and fruit-growing.

(3) **Tropical Forest.** The coastal belt, extending from Arnhem Land to Queensland, and including the Queensland portion of the eastern highlands, is clothed with a

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fairly wide belt of tropical forest. (a) In the northern part of this region which gets summer monsoon rains, the undergrowth is thick and the trees are similar to those of the Malay forests, for the rainfall is heavy and the temperature high. Mangroves also fringe the coast in many places. Inland the tropical forest gradually changes to more open thorn woodlands, and later to the acacias (wattles) and eucalypts (gum-trees) of the savanna. (b) The east coast of Queensland has rain all the year, but most in summer and least in spring. On the Bellenden Ker Range the annual total exceeds 100 inches. As temperatures are also lower, the forest becomes more open toward the south. The cabinet woods found in the wet forest to the north are replaced to the north and south of Brisbane, by woodland areas of pine and cypress. Round Brisbane farming is carried on intensively, with a wide range of crops varying with latitude.

Off the northern coast lie the coral reefs of the Great Barrier following the coast for 1200 miles at a distance from it varying from thirty to seventy miles. It is the longest reef of its kind. Between it and the coast is a channel of calm water varying in depth from 10 to 60 fathoms, but studded with several islands. Along this channel shipping passes to and fro to India, China, and Japan. The reef thus plays a similar part to the skerry guard of Norway. The coral polyp will live and grow only in clear shallow water where the temperature is never much above or below 70° F. Where the water is sullied by soil brought down by the swift rivers there are gaps which are convenient gateways. When the branching coral reaches the surface the waves pile up the broken coral on the reef. In the north near Torres Strait fishing for the pearl-shelled oyster is an important industry, and everywhere along the reef natives gather large quantities of trepang (*bêche-de-mer*)—a small, cucumber-shaped creature which, when prepared, fetches a good price in the markets of China.

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(4) The **South-eastern Highlands**, with rain at all seasons. This is the most important region from the point of view of settlement, for most of the population lives within 300 miles of this coast. Though the northern part is a distinct region as just described, it is convenient here to describe the range as a whole. The eastern highlands are not a uniform system of folded mountains like the Andes; they are a confused mass of ancient rock formations which were originally upfolded, but have been worn down by erosion and then re-elevated and much broken by faults. Volcanic rocks have intruded among the sedimentary rocks. This makes it difficult to represent the relief in the generalized maps of an atlas, so that some of the mountain ranges usually indicated are in reality flat highland areas where the drainage is very difficult to define. The best-defined ranges, such as the Liverpool Range and the Blue Mountains, are folded and faulted massifs capped with basalt or intruded with igneous rocks.

The name Great Dividing Range is now seldom used. It is certainly the most important watershed separating the basins of the swift-flowing coastal rivers and the slow rivers of the plains, and it is a climatic boundary. But it is not of uniform structure, and politically it unites rather than divides, for railways follow it as well as cross it, linking the states to each other and the ports to the hinterland. In preference the names of the various sections are used. In Queensland the highlands are a plateau some 3000 feet high and 300 miles broad, rising to the highest point in the Bellenden Ker Range, 5240 feet. The coastal plain is narrow and rivers have eroded wide valleys. The Fitzroy and Burckedin valleys provide important railway routes to the interior from Rockhampton and Townsville respectively. In the south of Queensland the Darling Downs—covered with sheets of basalt—are connected with the New England Range of New South Wales, which rises to 5000 feet in Ben Lomond, but in some parts is little above 2000 feet. The east-west spurs have separate

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names. The Hunter river separates the New England Range from the Blue Mountains, which attain to 4000 feet, with a particularly steep escarpment. Lake George and the head of the Murrumbidgee mark the Goulburn gap at the end of the range. To the south the Australian Alps reach 7328 feet in Mount Kosciusko. The mountains of

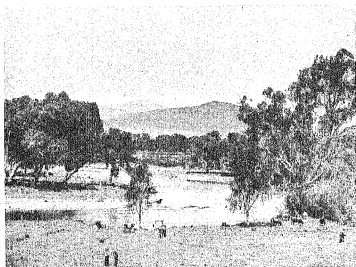


FIG. 233. THE KOSCIUSKO MASSIF FROM THE UPPER MURRAY

By courtesy of the Immigration Office, Commonwealth of Australia

Victoria, although over 5000 feet at many points, are really an old peneplain which has been uplifted. They also lie in the region of winter rains. The whole coast receives plentiful rain. Sydney receives 49 inches, well distributed throughout the year, but most in autumn. All the east coast is liable to heavy downpours, and the short, swift rivers are liable to flood. But this coast has the best harbours and the largest towns.

(5) The Region of Winter Rains. (a) *The South Aus-*

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tralian Highlands. This highland region flanks the shores of Spencer's Gulf—Flinders Range to the north and Mount Lofty near Adelaide being best known. Immediately to the west lies a rift valley comparable in structure to the rift valleys of East Africa. Lake Torrens is only eighty feet above sea-level and Lake Eyre is thirty-nine feet

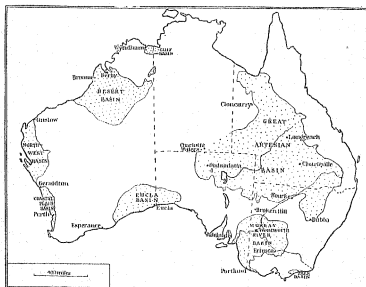


FIG. 234. AUSTRALIA: ARTESIAN BASINS

below it, while Spencer Gulf is the southern extension flooded by the sea, and is therefore not an estuary as the map might suggest. Running north and south, these highlands extract a good rainfall from the westerly winds in winter, when Lake Eyre is sometimes almost joined by floods to Lake Frome, making a great horseshoe-shaped lake round the north of Flinders Range. But there are no rivers of any importance, and the lakes become shallow and salt, or dry completely (Lake Eyre) by evaporation

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during the long season of drought. Round Adelaide the sunny northward-facing slopes, where rainfall is about 20 inches, are planted with vines. Wheat-growing and mixed farming are carried on near the highlands in the peninsula of Eyre, Yorke, and Mount Lofty, where the rainfall is between 13 and 20 inches. Sheep-farming is successful up to the 10-inch limit of rainfall. In Victoria the highlands lie longitudinally to the winter westerly winds. The southern slopes of the mountains receive most rain and are forest-clad. Gippsland (South-east Victoria) also gets summer rains from the south-east winds. This natural region is the most densely populated part—nearly three times the density in New South Wales—for all the products of warm temperate lands do well, and there are valuable minerals in the mountains.

(b) *The Temperate 'Mediterranean' Region of the South-west.* Along the flat western coast, where rainfall over 15 inches occurs, mixed farming and fruit-growing is profitable. Up the escarpment to a height of 1000 feet, but especially in the peninsula between Perth and Albany, are forests of hardwood. The giant eucalypts, the jarrah, and the karri growing 200 to 400 feet high are famous for their great strength and durability. They are particularly valued for railway and dock-construction work and wood-block flooring. To the east, as rainfall diminishes, the forest thins out into bush. Wheat is grown, but cattle- and sheep-pasturing is at present more important. Along the south coast stunted gum bushes, known as mallee, grow extensively. The south coast is a cliff coast without a harbour for 1000 miles, and receives occasional rains in winter.

Plants and Animals. The plant forms—the gum-trees that exude resin, the eucalyptus which, on the poorer soils, turns its leaves edgeways to the sun as a device to resist drought, the palms, and the tree-ferns—possess many striking features due to long isolation from other lands.

The peculiarities of Australian animals are also well

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known. The kangaroo and some other mammals are marsupial—*i.e.*, they carry their young in pouches. The cassowary and emu are running birds which have lost the power of flight. The so-called flying foxes and squirrels have membranes similar to those of a bat, which enable them to plane down from the trees, but they do not really fly. Other unfamiliar animals include the platypus, with a flat bill like a duck, and webbed feet, which lays eggs and yet suckles its young like a mammal, the dugong, a fish-like mammal which is herbivorous and has lungs instead of gills, tree-climbing frogs, and whistling spiders. These peculiarities are due to long isolation from the struggle for life against newer and better-equipped animals which developed in the other continents. But the European animals introduced by settlers have flourished, and the native animals have been crowded out in many cases. The dingo or Australian dog, however, survives in spite of continuous attacks upon him. This savage dog does much damage to sheep in some districts.

Livestock. The pastoral industry is the most important, and Australia has by far the greatest number of sheep in any part of the world except the continent of Europe. The number fluctuates owing to occasional drought, but in recent years has risen to 106,000,000. The original sheep were brought from Bengal and South Africa. The wool of the former was more like hair. The texture of the wool was gradually improved by scientific breeding, and the average weight of a fleece has increased from 3½ lb. to 8 lb. or more. Sheep can thrive even where vegetation is sparse if the area is extensive, as it is in Australia. They need few people to tend them. Wool is more important than the meat in the many districts which are far from markets. But nevertheless 10 per cent. of the flocks are used for mutton, and the value of exported mutton reaches the substantial sum of £750,000 a year.

The chief enemy is drought. The temperatures are high

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enough everywhere for open grazing throughout the year, and sheep like the salt-bush which grows naturally in the dry belt between the grasslands and the desert. But some water is necessary. Artesian wells solve the difficulty to some extent. Thousands of such wells have been sunk, chiefly in West Queensland and New South Wales, and

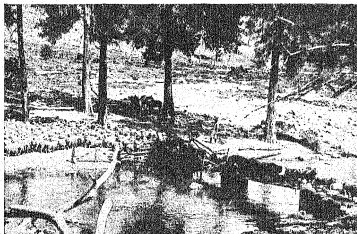


FIG. 235. MOB OF SHEEP CROSSING A CREEK

By courtesy of the Immigration Office, Commonwealth of Australia

some are nearly a mile deep. From some of these bores water flows, but from many it has to be pumped. There are two theories to account for this underground water. The more generally accepted one is that rain penetrates the porous rocks in a high wet area and flows down the slope of the strata, becoming imprisoned between a layer of clay and impervious rocks above it. When these layers are bored through, the water is released and comes to the surface under pressure from the higher levels. The other theory attributes the supply to subterranean storage in the rocks from the time when the plains were the floor of

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a sea. The water contains many salts in solution, and while it is invaluable for stock, its value for agriculture is probably less than that of surface water which is stored by building dams. In any case its supply seems to be too limited to allow irrigation for extensive agriculture.

Temperatures as well as water-supply must be considered—the desirable average is not above 75° F. as a rule.

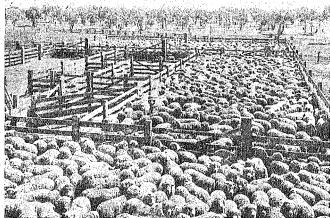


FIG. 236. SHEEP-SHEARING TIME

Photo Information Office, Commonwealth of Australia

Combining these factors, we see that the western slopes of the highlands, especially in New South Wales and Victoria, are the ideal areas. The highlands themselves are excellent, especially for breeds raised for meat as well as wool, like the merino, Lincoln, and Leicester. The western plains graze sheep of poorer type, and the coastal plain the coarse wool sheep. The Riverina district of New South Wales contains nearly half the flocks, the sheep pastures of Queensland round Longreach, Cunnamulla, and the Darling Downs about one-sixth, and the Ballarat district in Victoria also one-sixth of the total.

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The shearing, usually done in August and September, is carried out in large buildings specially planned to ensure that the wool is quite dry when shorn in order to prevent fermentation, and also that the sheep are handled expeditiously. The shearing is done by machinery or hand, or both. The wool is compressed into bales of about 350 lb., and sent by wagons drawn by teams of oxen to the railhead,

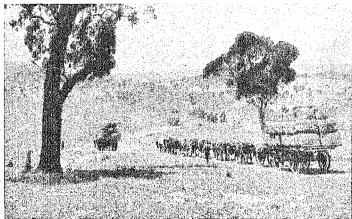


FIG. 237. WOOL TEAMS ON THEIR WAY TO THE SEAPORT

By courtesy of the South Wales Government Tourist Bureau

and so to the nearest port. Some of it is washed in soapy water to remove the grease, but most of it is exported unscoured. The Australian wool clip amounts to one-quarter of the total world-production. Australian wool goes chiefly to London and other European markets.

Australian woollen mills are, however, slowly increasing in number. There are now fifty-seven mills, of which number Victoria and New South Wales together possess forty-five. Geelong and Sydney are the chief cities concerned.

The rabbit pest reduces the amount of pasture, particu-

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larly in the west. New South Wales and Western Australia have spent millions of pounds in fencing, but they continue to spread. Foxes and dingos (wild dogs) attack and kill many lambs and sheep.

As cattle need long, moist grass, the areas suitable for them are much more restricted than for sheep. A minimum rainfall of 20 to 25 inches may be taken as a guide,



FIG. 238. MOB OF THREE THOUSAND BULLOCKS OVERLANDING FROM THE GULF COUNTRY (NORTH QUEENSLAND) TO NEW SOUTH WALES

By courtesy of the Immigration Office, Commonwealth of Australia

so that the east coast, Queensland, and Northern Territory are the most suitable areas. The number of cattle is about 11,500,000, which includes about 2,500,000 dairy cattle. Queensland (especially south-east) contains nearly half the cattle reared for beef, but a large number of dairy cows are kept. Dairy cattle are reared chiefly in New South Wales, Victoria, South Australia, and Tasmania. These are mostly grazed on the coastal plains. Gippsland (Victoria) and Mount Gambier (South Australia) are the best dairy districts.

Dairy cattle do best in the cooler, wetter districts, but

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the beasts with the highest yield of beef come from the warmer districts of the north and west. The development of butter export is comparatively recent and is expanding. The value of the butter exported exceeds that of the beef and about equals that of the hides and skins. The butter factories are largely co-operative. Cheese, milk, and milk products have doubled in value in the last twenty years. There are also about a million pigs, mainly in New South Wales, Victoria, and Queensland. Bacon and ham, therefore, are valuable products. Britain and France purchase the larger part of these supplies.

Poultry-keeping and egg-production is favoured by sunshine throughout the year, Victoria, New South Wales, and South Australia being the most productive. Goats to the number of 200,000 are reared.

There is also horse-breeding, not only for home needs, but for export to India and elsewhere. There are about 2,000,000 horses, New South Wales and Queensland being the chief areas. Mules and donkeys as well as camels are also used for transport in Western and South Australia.

Agriculture is only less important than the pastoral industry, and much more important than mining. The most important crop is wheat, which is grown chiefly in the coastal belt south of Brisbane, commencing about 150 miles from the coast, extending inland to a depth of 100 to 150 miles. Autumn and spring rains are more important than the annual amount, which varies between 15 and 25 inches. The former are needed for ploughing and the latter for maturing the grain. Although 'dry farming' has increased the possible wheat area, there is a close connexion between rainfall and yield—viz., about five bushels per acre less than the winter rainfall in inches. New South Wales, Victoria, and South and Western Australia each has two to four million acres under wheat. Irrigation has made the Riverina and the lower Murray very successful farming areas. In Victoria the Wimmera is the best wheat district. In South Australia the wheat

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belt extends over rolling country for 150 miles inland north of Adelaide. In Western Australia the wheat belt measures 600 by 200 miles in the south-west area. Soils are mostly red loam, but vary to fairly heavy clays; they are rich and easily worked, for the natural vegetation of grass with gum mallee and pine is easily cleared, and level plains permit ploughing and reaping by machinery. Owing to the abundance of bright sunshine, the wheat is hard and makes the highest grade flour. Australia has about 14,000,000 acres under wheat, which is about half the area in Canada under the same crop.

Wheat-growing and sheep-rearing generally go together for economy. The sheep fertilize the ground, and keep down weed growth on fallow land. Considerable crops of hay, oats, maize, green forage, potatoes, and barley are grown, and market-gardening is found near the towns. Tobacco- and cotton-growing have begun, but rice, tea, and coffee await the solution of the cheap labour problem. Efforts are being made to extend the cotton-growing industry. Cotton is mainly confined to the coastal region of Queensland, but is extending southward in New South Wales, and grown under irrigation in central Queensland. Western Australia has a suitable area. But it is mainly grown only as a subsidiary crop. Ginning and oil mills have been erected. The main difficulty again is the cost of labour, which applies also to the sugar-cane crop of Queensland grown round Bundaberg, Mackay, and Cairns. Both are worked entirely by white labour. The sunny climate is very favourable to fruit-growing. Tropical Queensland produces bananas, pineapples, mangoes, and oranges, while the temperate south grows apples, pears, peaches, plums, every kind of citrus and berried fruits. Raisins are an important product in the vine-growing 'Mediterranean' districts. Tasmania is famous for its apples, but other fruits do well.

Forestry. Australia is not so rich in timber as the other continents, but hardwoods, ironbark, and gums found in

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the south-east and south-west are of excellent quality; the red and white mahogany, rosewood, bean, maple, and cabinet woods are found in north-east Queensland in Gippsland, and in the Yorke Peninsula of South Australia. The region of the most valuable hardwood (jarrah and karri) is south-west Australia, as already mentioned. Soft woods for houses are mainly imported from New Zealand and America. The chief Australian softwoods are the cypress, pine, and cedar found on the western slopes of the highlands.

Mining. The discovery of gold in New South Wales in 1851 began the development of population in Australia, for numbers increased from 220,000 to over 1,000,000 in twenty years. Mineral products now constitute only 5 per cent. of the annual wealth produced. But there is still much gold to be won, and the ancient rocks, both of the desert plateau and of the highlands, are rich in silver, lead, zinc, copper, tin, iron ore, and many other metals.

Fortunately for transport reasons, the most important coalfield is found along the coast, east of the Blue Mountains, between Newcastle on the north and Bulli on the south, and extending inland to Lithgow. Sydney occupies a central position in this district, and is thus able to export coal to Chile and Asia as well as to other parts of Australia and New Zealand. The coal is of excellent quality and lies in horizontal seams at no great depth. Newcastle and Maitland are the chief mining centres. Lithgow having local supplies of iron ore is a great iron and steel centre. The annual output of this coalfield exceeds 7,000,000 tons.

In Queensland the coal lies inland in widely separated basins, the most productive of which is at Clermont, west of Rockhampton, Ipswich, near Brisbane, Maryborough, and two districts in the Northern Highlands west of Cooktown are also mining areas. But the whole Queensland output is only about one-sixth that of New South Wales.

In Victoria coal is found in Gippsland, where the output nearly equals that of Queensland. In Western Australia coal

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is worked in the south-west, but is not of such good quality. Tasmania too has coalfields on the east coast near Fingal, and in the south. Thick deposits of somewhat poor coal occur also at Leigh's Creek in the north of the Flinders Range of South Australia.

Manufactures. During the last twenty years Australia has ceased to be merely the producer of raw materials. Under the supervision of British operatives manufactures of all kinds have developed. Many famous British firms engaged in the steel trade, boiler-making, confectionery and woollen trades, have established Australian factories. The number of factories connected with clothing and textile fabrics, food and drink, metals and machinery, vehicles and harness, woodwork, books and paper, and many others have steadily increased, and now total some 23,000. There are now more people employed in manufacture than in the production of raw materials. The value of manufactured products now exceeds even that of the pastoral products. But production is mainly for the home market, for the population is at present insufficient to organize any industry on a scale sufficiently large to compete in the world's markets. Although practically every raw material is available Australia is so remote that transport costs are bound to be high. Even in the soft-fruit trade (pears, peaches, etc.) it is necessary on this account to dry them or tin them for export. These manufacturing industries are not confined to the large towns, but are opening up in country centres. They are 'safeguarded' against unfair competition from imported goods by tariffs. These tariffs are planned to keep out alien goods made where conditions of labour are unfair, to admit a reasonable amount from friendly countries, and in all classes to admit British goods on a lower rate than for any other country. The countries of eastern Asia contain enormous populations, among whom the demand for western goods is increasing. At present Australia's trade with the East consists mainly of butter, coal, copper,

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grain, horses, skins, and wool. Increased population alone can enable Australia to reap the advantage of nearness to Eastern markets.

Social Life. The standard of life is high, for the Anglo-Saxon passion for democracy has been unrestricted. Education is highly developed and free. The cities are modern in every way, spacious and beautifully laid out with parks and recreation grounds. Away from the coast there are many county towns, each a market and social centre for the countryside, and now much better served by roads and railways than at first. Sport of all kinds plays a big part in every one's life, but work no less is required from all. But townships are often far apart, and the population is small for such large areas. England and Wales, with an area of about 58,000 square miles, have a population of 40,000,000, or 700 persons per square mile. Queensland has a total area exceeding 670,000 square miles, yet its total population is 756,000, or about one person per square mile.

It is natural that the large towns should be on the coast, for the coast enjoys the best climate, and conditions of life depend largely upon the interchange of raw materials for the manufactures from abroad. There are, of course, many other reasons, partly historical and partly economic.

Political Divisions and Towns. Queensland is the second largest state of the Commonwealth and third in population. More than half its area lies between the tropics, so that large areas are thinly populated. On the whole population is more evenly distributed than in the other states. The chief agricultural product is sugar. The cultivation of this crop is often combined with dairying. Maize and wheat, together with many fruits, are also cultivated. The chief minerals produced are coal, copper, and tin. The most developed area is the temperate south-east.

Brisbane (319,000), the capital, is finely situated on the navigable Brisbane river, fourteen miles from Moreton

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Bay, amid sub-tropical trees and palms. The two halves of the city are linked by the great Victoria Bridge. Unlike Melbourne, it is not centrally situated, and has many smaller ports competing with it. River floods have silted the estuary, which, in spite of dredging, is too shallow for large vessels. The rich region of the Darling Downs, with its cattle and sheep pastures, wheat, and minerals, and



FIG. 239. A FARM IN QUEENSLAND
Photo E.N.A.

the railway from the interior, supplies the chief exports of wool, frozen meat, and dairy products. Among the more prosperous of its industries are boot factories and tobacco and soap-making works. Other products from coastal plains, like sugar (molasses and rum), fruit, arrow-root, maize, and wine, are distributed by train or ship to other parts of the Dominion.

Rockhampton, on the Fitzroy, thirty-five miles from the sea, collects the products of a large hinterland, and is an important railway terminus, with tanneries and refrigerating works. Townsville, in north Queensland, is the

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second port of the state. Its exports include sugar from the Burdekin valley and gold and copper from the interior, while its industries deal with sugar, dairying, and meat. Maryborough is a centre for fruit and timber and a port for the minerals from Gympie and the Burnett valley. Cairns has a fine harbour and serves an important district likely to develop. Besides being attractive to tourists, the district produces sugar, bananas, and timber. Tin and silver-lead from Herberton, and copper from Chillagoe are



FIG. 240. SYDNEY BRIDGE, 1931

Photo Australian Government

also shipped. Mackay and Bundaberg are the chief centres for sugar; Gladstone for cattle and copper; Cooktown for pearl and *bêche-de-mer* fisheries.

New South Wales contains a third of the total population, although the state occupies only one-tenth of the total area. In the production of wool, wheat, dairy produce, and coal, as well as in manufactures, it is the leading state. Population centres chiefly round Sydney and Newcastle.

Sydney (1,253,000), the capital, is the largest and oldest town of the Commonwealth. It is built on one of the wonder harbours of the world, which has a circumference of 200 miles of coastline, with deep water close to the shore. Six miles from the entrance to the harbour, the opposite shores have now been spanned by a great bridge,

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the central span of which is 1670 feet long and 170 feet above the water. Sydney is the main base for the Australian Navy. Beautiful in its setting, with blue water, blue mountains in the distance, and wooded bays, it is not surprising that its population has more than doubled within the last ten years. It attracts to itself most of the overseas shipping of the continent; for round it lies the best coalfield, and railways bring to it for export the pastoral, agricultural, and mineral wealth from all parts—wool and frozen meat, wheat, coal, hides, skins and tallow, gold, fruit, and cabinet wood. From abroad textiles, motors, oils, machinery, tea, and all kinds of manufactures are brought to its warehouses. Locomotives and rolling stock, woollen and leather goods, soap and furniture, are among its flourishing industries, carried on in more than five thousand factories.

Newcastle (104,000), 60 miles to the north on the Hunter river, is the chief coal port of the Dominion. The industries are smelting, engineering, and shipbuilding. It is the fourth port of the Dominion and has a large general trade. Grafton and Lismore are typical towns in the coastal district to the north, which have sugar refineries, sawmills, and tanneries, and are centres of a rich dairy and agricultural area.

Of towns in the interior, Broken Hill is the largest of the mining towns, and contains half the population of the western division of the state. Of the towns not concerned with mining, Goulburn is the largest. It is an important railway junction, market, and tourist centre, with woollen mills, milling, brewing, tanning, and shoe industries. At Bathurst gold was first discovered in Australia in 1851. It is now a centre also for wheat and has industries like Goulburn, together with the manufacture of railway plant.

Large areas are being developed by irrigation schemes in the valleys of the Murray and Murrumbidgee and elsewhere. The best known is fed by the storage dam at Burrinjuck. This reservoir, over 20 square miles in area,

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feeds the settlement, which is 240 miles from the dam and which extends over 150 miles down the river. Cold-storage plant and factories have been built for the preparation for market of butter and cheese, bacon and fruit, and the products of the land thus irrigated.

Federal Territory. Canberra (8000) is the Dominion



FIG. 241. CANBERRA, FROM RED HILL

By courtesy of the Development and Migration Commission, Commonwealth of Australia

capital, standing in Federal territory 940 square miles in extent, drained by a tributary of the upper Murrumbidgee. Like Washington (U.S.A.) and Ottawa in Canada it is placed near the most important state capitals without advancing the prestige of one at the expense of another. Its highland site, nearly 2000 feet above sea-level, is sheltered by well-wooded higher hills, and is well supplied with water. It is a beautiful city, with a magnificent Parliament House and other national buildings. The dis-

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tance to Melbourne is twice that to Sydney, but the main line between the two passes within easy range.

Victoria enjoys the most temperate climate of the mainland states, and, though the smallest of them, has a population approaching that of New South Wales. It is there-

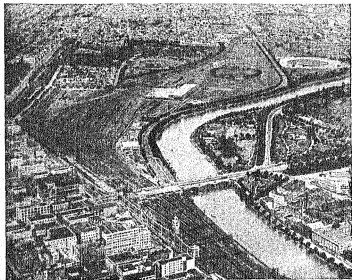


FIG. 242. MELBOURNE, SHOWING PRINCE'S BRIDGE, WITH FLINDERS STREET STATION IN THE FOREGROUND

By courtesy of the Development and Migration Commission, Commonwealth of Australia

fore well developed. More than half the population of the state centres round Port Phillip. Pastoral, agricultural, and manufacturing occupations are more important than mining. The state grazes a large number of cattle, and dairying is more important relatively than in any other of the states. There is also a big trade in wool both for export and for local manufacture. The agricultural products are those of temperate lands, wheat occupying over

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60 per cent. of the cultivated area. Oats, vines, and orchards occupy a large part of the remainder. Forestry too is important, particularly for coniferous trees.

Melbourne (1,018,000), the capital, is, like Sydney, also favoured by nature—a large land-locked harbour, central on the south-east coast, rugged, wooded highlands in the background, across which the Kilmore Gap provides an easy crossing. Railways to the interior were easier to construct than from Sydney, but Port Phillip being the drowned valley of the Yarra river is shallower both at the entrance and at the shores than Port Jackson. Large vessels berth at Williamstown and Port Melbourne. Its thoroughfares are wider than those of its older rival. Like Sydney, it is the intellectual and social centre of the state, with a university, art gallery, museum, and libraries. The gold from Ballarat and Bendigo commenced its prosperity, which now depends far more upon wool, wheat and flour, wines, frozen beef, hides, and skins, which are both exported and also used for its own industries, as varied as those of Sydney. Its total shipping trade is about three-quarters that of Sydney, but includes more coastal and less overseas trade.

Geelong (43,500), forty-five miles to the south-west, also lies on Port Phillip. It exports wool and wheat. Ballarat, seventy-five miles to the north-west, a railway junction and the third city of Victoria, has flour-mills and breweries and manufactures woollen and iron goods. Bendigo, a hundred miles north, is a railway centre and a market for wheat, wine, and pastoral products. Engineering and manufactures of woollen and leather goods, pottery, bricks, and tiles are carried on. Echuca, on a river confluence of the Murray, is a river port and the present head of navigation. It distributes minerals and agricultural produce to Morgan (for Adelaide) by river, and to Melbourne by railway. It is the centre for wine and dried fruits, and has brewing, wagon-making, and woollen industries. Mildura, near the Darling confluence, is

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another wheat, wine, and wool centre for the irrigated lands round the Wimmera district in the south.

South Australia has more than four times the area of Victoria, but a total population of only half a million, which is less than a third of that of Victoria. This is largely due to insufficient rainfall, for only one-fifth of the



FIG. 243. MALLEE, VICTORIA

Rolling down and burning off this growth has cleared much land for wheat-growing.

By courtesy of the Immigration Office, Commonwealth of Australia

area receives an annual rainfall of over ten inches. The eastern side of St Vincent Gulf contains the bulk of the population, Adelaide itself having more than half of the total for the state. Much has been done to supplement the supply of water from artesian bores, particularly for the pastoral industry. Wool is the staple product. Very little beef, mutton, or butter is available for export. Agriculture yields crops of wheat, barley, and oats from the area round Adelaide and the south-west. The state produces

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two-thirds of Australia's barley. Under irrigation vines and fruits are grown. Manufactures are not much developed, and mining, though important in the past, has considerably declined.

Adelaide (325,000), the capital, is the third largest port

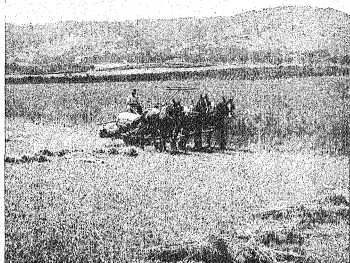


FIG. 244. HARVESTING WHEAT, NEAR ADELAIDE

*By courtesy of the Development and Migration Commission,
Commonwealth of Australia*

in the Commonwealth. This too is a beautiful, well-planned city, standing on the river Torrens, which crosses the plains at the foot of Mount Lofty. Adelaide is about five miles from the coast. The ocean cables and overland lines from Port Darwin in the north and from all the capitals meet at Adelaide, and add importance to the share market. Manufactures are varied, including milling, brewing, pottery, and hardware. Its trade in wheat and

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flour, wool, wines, fruits, and minerals collected from the irrigated lands of the Murray and Broken Hill district of New South Wales amounts to one-third of the trade of Melbourne. Port Augusta, the terminus of the trans-continental railway at the head of the Spencer Gulf, has a considerable wheat trade. Port Pirie (10,000) smelts and exports silver-lead ores from the Broken Hill region as well as wheat. Other towns are comparatively small, with populations below 4000. Industries in these settlements are chiefly connected with agriculture.

Western Australia, the largest of the states, covers almost one-third of the continent, but much of the area is uninhabitable, and the population is less than half a million. Over a third of the area is within the tropics, and the greater part is a plateau, with an average height of about 1200 feet. The rainfall over nearly half the state is less than 10 inches. The south-west corner enjoys the best climate, contains half the population of the state, and here agriculture is developing. The acreage under wheat has trebled in the last ten years. This part also produces valuable timber, especially hardwoods like jarrah and karri. Fruit-farming and wine production are increasing. Sheep are reared in increasing numbers both in the wheat belt and on the scrub lands, and wool is exported. Dairy-ing is less important than elsewhere, but beef is exported. Mining is chiefly concerned with gold, of which the state produces four times as much as the rest of the Commonwealth.

The towns of Western Australia have the disadvantage of being, like British Columbia in Canada, far from the other populated areas. But the area is nearer the Suez Canal route. By this route Fremantle is 1650 miles nearer London than Melbourne and over 2000 miles nearer than Sydney.

Perth (200,000), the capital, has increased its population fivefold in the last twenty-five years. It is a city of wide streets and open spaces; the climate is hot, but tempered

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with westerly breezes. It stands at the head of navigation on the Swan river, twelve miles above Fremantle, the fifth port of Australia. Gold from Coolgardie and wheat and timber from the south are exported; the local industries are smelting, tanning, and flour-milling.

Geraldton, 300 miles to the north, in the dry area, is a growing port which exports the wheat, wool, and minerals

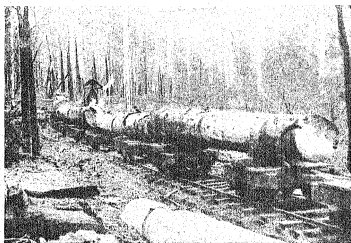


FIG. 245. TIMBER TRAIN, WESTERN AUSTRALIA

*By courtesy of the Development and Migration Commission,
Commonwealth of Australia*

from the Murchison and Yalgoo goldfields. Albany, 350 miles south-east of Perth, has an almost landlocked harbour. It is a fortified coaling station, and exports wheat, timber, and wool. Bunbury is the second port for the state and serves the Collie coalfield. It exports also timber, wheat, and wool. Northam, on a tributary of the Swan, is the chief agricultural centre, with flour-milling and brewing industries.

The populations of Kalgoorlie and Coolgardie have rapidly declined since the beginning of the century. The

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largest town on the goldfields is now Boulder (5500), near Kalgoorlie. Water is brought from a dam in the Darling Ranges west of Perth by nine pumping-stations which lift the water over 1000 feet. The water flows by gravity from one pumping-station to the next, roughly forty miles apart. This scheme cost nearly £4,000,000, and the charge for water increases with distance.

The **Northern Territory** covers 523,620 square miles, but the total population is less than 5000. The Northern Territory is at present divided into two administrative areas called Northern Australia and Central Australia, the former having a Resident at Darwin and the latter at Alice Springs. Darwin is the chief centre, and has a fine harbour, which is but little used except by coasting vessels. The other populated centres, such as Alice Springs, lie along the telegraph route, and stock-rearing is the chief occupation.

Tasmania is about the size of Scotland, and similarly has a small proportion of cultivated land. Half the island is forested with pines, beeches, and gums. Lying in the belt of the westerlies, in the latitude of Patagonia, it has ample rain throughout the year, but is free from floods and tornadoes. The best agricultural areas and soils are in the lower, drier, warmer east. Seasonal conditions vary considerably, crops being harvested in some parts when not showing above the ground in others. Productions are therefore varied, and there is no staple product. Productions of fruit, hops, oats, wheat, potatoes, and hay maintain a much more even yield than in the mainland states, serious drought being unknown. The wool production has much increased.

The fruit-growing district is in the sheltered south-east valleys (Derwent, Tamar, and Mersey). Over 3,000,000 bushels of apples are produced every year. Pears, apricots, plums, and small fruits bring considerable income to the island.

Dairy-farming is conducted on the co-operative principle

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under State provision. Nearly 3000 tons of butter and over 400 tons of cheese are produced annually. This industry flourishes in the wetter region of the north-east and north-west. On the eastern slopes of the highlands some 2,000,000 sheep are grazed.

Minerals (chiefly zinc and copper, but also tin, silver,

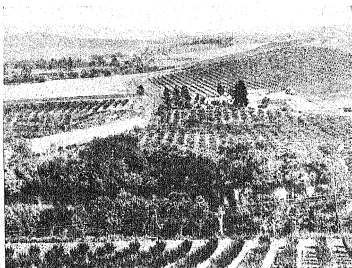


FIG. 246. APPLE ORCHARDS, TASMANIA

By courtesy of the Immigration Office, Commonwealth of Australia

lead, and coal) to the value of £1,500,000 are produced annually. Zinc and fresh fruits head the list of exports. Manufactures are increasing with the aid of electricity. These include not only the manufacture of woollen goods and the smelting of ores, but fruit-preserving and confectionery-making. On a smaller scale a number of factories deal with timber, leather, and agricultural products.

Hobart (57,000), the capital, is picturesquely situated at the foot of Mount Wellington, which is often snowclad.

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It faces a beautiful bay opening to the Derwent estuary. It is the oldest Australian city after Sydney. Easy routes by river valleys lead to all parts of the island, and a great hydro-electric scheme recently completed provides the cheapest current in the world. It is the chief centre for the industries above mentioned. A railway runs to the north through the dairy lands and orchards to Launceston (29,000), the next most important town forty miles up the Tamar estuary. Launceston is nearer to the mainland and to the mining areas. Its industries are similar to those of Hobart, but tin-smelting is also important. It also exports ores as well as timber, hay, oats, and potatoes to Melbourne, and receives from the mainland imports of machinery, textiles, clothing, and foodstuffs. But more than half of the trade of the island passes through Hobart, which lies on the Cape route to New Zealand.

Communications. Railways. As in Africa, railway development was hindered by natural obstacles presented by the highlands being close to the coast. The original object was the same—to connect some point on the coast with a mining or pastoral area of the interior—and lines developed independently of each other, so that there is no real system. Subsequently, in Australia, by skilful engineering and the construction of great bridges, lines have been completed along the east coast from Cairns to south of Sydney. But between Sydney and Melbourne there is no line from the coast to the interior, and no coastal railway except in the south of Victoria. The other main lines follow the highlands, as in Africa.

But whereas in Africa the lines from the coast converge and compete for the trade of the hinterland, in Australia they are more or less parallel and independent. In Australia, too, the traffic is more varied, including a larger proportion of the raw materials of food and clothing, as well as minerals. There are now about 28,000 miles of railway in Australia. In both Dominions most of the railways are now owned by the State, and in both the

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3 ft. 6 in. gauge is the one most used. In Australia, however, three gauges are in use. Queensland uses the 3 ft. 6 in., Victoria the 5 ft. 3 in., and New South Wales the 4 ft. 8½ in. gauge. The disadvantages arising therefrom are great and increasing. Thus in a six days' journey across the continent from Fremantle to Brisbane there are five changes of gauge.

	GAUGE		MILES
	FT.	IN.	
Fremantle—Kalgoorlie (W.A.)	3	6	387
Kalgoorlie (W.A.)—Port Augusta (S.A.)	4	8½	1051
Port Augusta—Terowie (S.A.)	3	6	120
Terowie (S.A.)—Albury (N.S.W.)	5	3	814
Albury (N.S.W.)—Brisbane (Q.)	4	8½	1012
Total			3384

Before reaching Brisbane the fifth change back to the 3 ft. 6 in. gauge takes place at Jennings, on the Queensland border.

The first portion of this great route is a remarkable parallel to that from Port Nolloth to Ookiep, in South-west Africa. There is the same reason for its construction—an economic one—to tap the mineral wealth of the interior. The physical conditions are similar, a steep western scarp rising to tabular waterless desert. Between Kalgoorlie and Port Augusta four distinct types of country are crossed. For the first 167 miles the line crosses the granite plateau rising to 1326 feet, the highest point. This region is well timbered, with gums and eucalyptus growing to a height of 50 or 60 feet. But on the limestone Nullarbor plains, which extend eastward for 450 miles, not a tree is to be seen: only blue bush and salt-bush, whose leaves absorb moisture from dew and any chance shower. For over three hundred miles the line runs without a curve. East of the limestone region a belt of sandhills, fifty miles wide, is encountered. For the remaining four hundred miles to Port Augusta the line first crosses red soil plains, well timbered with oaks and eucalyptus; then, reaching

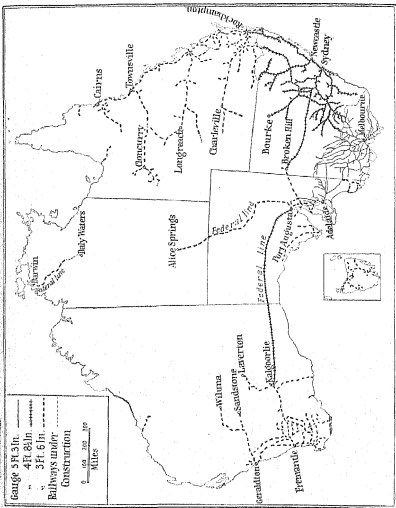


FIG. 247. AUSTRALIA: PRINCIPAL RAILWAYS AND GAUGES

Based on a map in the Commonwealth "Year-book"

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the granite once more, passes through the Wilgena sheep-run, 80 miles long, and finally past the shallow salt lakes, blue as the sea. For over a thousand miles not a single permanent stream of water has been crossed. This link between the eastern and western states saves three days on the run by sea from Fremantle to Melbourne, and is valuable for commerce and defence.

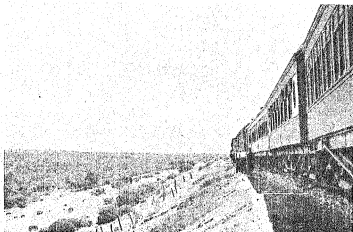


FIG. 248. THE TRANS-CONTINENTAL EXPRESS CROSSING THE TREELESS NULLARBOR PLAIN

By courtesy of the Development and Migration Commission, Commonwealth of Australia

Passing through Quorn in a gap of the Flinders Range, the line turns southward to Peterborough, a junction for the line from the great silver-lead mine of Broken Hill to Port Pirie. It then climbs a spur to Kooringa, near Burra, a once famous copper-mine, and so through wheat-growing and sheep country and along the vine-clad western slopes of the range to Adelaide.

Continuing its route from Adelaide, the line runs across the Mount Lofty Range to the east to negotiate which necessitates nine tunnels and a viaduct over a

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hundred feet high. The western slopes of the range are covered with beautiful residences and vineyards. A rapid descent is made to the plain to cross the Murray, where the old river swamps have been drained to grow maize and vegetables. To the east is a huge district now growing wheat. But between the Murray and the Victoria boundary the train runs for ninety miles through limestone plain, with mallee and eucalyptus growing in thick clusters. Mount Gambier, a town on a branch to the coast, is the centre of a district which has a rich volcanic soil and good winter rainfall, and grows all the English fruits and vegetables. There is also rich pasture for dairy cattle.

The line then climbs across the complicated highlands to Ballarat, the largest inland city of the Commonwealth, situated to the south of the famous goldfield. A sharp descent down the southern scarp of the highlands is made to Melbourne, 482 miles from Adelaide. The railways of Victoria have been extended from Melbourne, first to suburban districts, like Geelong, then to the goldfield, and finally on the route to Sydney, so that the mileage of 4713 miles in Victoria, the smallest state, compares favourably with that of Queensland (6460 miles) and New South Wales (6014 miles).

Climbing once more a gap in the highlands, the line turns eastward to Albury, where the New South Wales train is boarded. To the west lie the wheat and sheep lands and the vineyards of the Riverina. To the east is the rugged base of Kosciusko, sometimes snowclad. The Murrumbidgee is crossed at Wagga, to the west of which are the fertile lands irrigated by water from the Burrinjuck reservoir, near Yass. A little later the line forks to approach Sydney, either by a northerly route through mining towns and farming pasture-land along the western slopes of the mountains, or southward through Yass to Goulburn. The northerly route is the more difficult, but very picturesque. The Blue Mountains are cut by river gorges a thousand feet deep. After passing through

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Bathurst, an industrial town in a wheat and sheep valley, there are a series of summer resorts. Many people visit the Jenolan Caves, near Katoomba, which are perhaps the finest example of water action in limestone strata, similar to the Cheddar Caves of the Mendips or those of Derbyshire, in England.

The construction of this line across the Blue Mountains was accomplished with great difficulty, for the ascent from both sides is very steep. There are gradients of 1 in 30, zigzags, curves, and tunnels, the highest being nearly 4000 feet above sea-level. The southern route crosses the broad intermont depression of Lake George to the farming town of Goulburn, and on to Sydney, which is 582 miles from Melbourne.

From Sydney the line follows the coastal plain, crossing the Hawkesbury estuary by a mighty bridge to the coal-field and the fertile plains south of Newcastle. Here it leaves the coast and proceeds up the Hunter river through fields of maize and mining towns. Having crossed the Liverpool Range to Tamworth, it climbs to the granite plateau—thus avoiding the gorges that lie to the east and the spurs to the west—and follows it to the Queensland border. After a change to the narrow-gauge carriages, the plateau is followed to Toowoomba, on the Darling Downs, a rich agricultural area. A rapid descent through Ipswich, a coal-mining centre, leads to Brisbane, which is 725 miles from Sydney. From Brisbane the route lies along the coast through the gold-mining town of Gympie, the sugar-cane-growing district of Maryborough, the cattle-grazing area round Bundaberg, past the great gold- and copper-mines of Mount Morgan, to Rockhampton, which is 397 miles from Brisbane.

Note the chief lines from the ports to the interior plains :

- (1) Sydney to Bourke, 450 miles, with its important branch to gold- and copper-mines at Cobar.
- (2) Brisbane to the pastoral town of Cunnamulla, 600 miles.

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- (3) Rockhampton to Longreach, 428 miles, almost following the tropic.
- (4) Townsville through the goldfields of Charters Towers to the copper area of Cloncurry or the pastoral district of Winton. (The above routes are now joined by a line connecting Longreach to Winton.)
- (5) In North Queensland the line from Cairns, which serves a rich mining area.
- (6) Port Darwin to Pine Creek and Katherine, on Katherine river, 200 miles.

In all these cases, however, the lines differ from African railways in that, having climbed the steep scarp, they descend again and cross lowland plains instead of high veld. African conditions are, however, found in Western Australia. For in this part lines grow outward from the ports of Geraldton, Fremantle, Bunbury, and Albany, and the main line which links them runs along the plateau.

Another projected transcontinental route is to link Port Darwin to Port Augusta. At present a section runs southward from Port Darwin for 200 miles, and another section runs northward from Quorn through Oodnadatta to Alice Springs, which is about a thousand miles from Adelaide.

Although Australia has a great length of railway in proportion to population, the mileage is low in regard to area compared with other countries. But the motor-car, lorry, and 'caterpillar' tractor are reducing distances, and, although roads outside the settled farming areas are often poor, the general flatness of the interior favours movement.

Navigable Waterways. Speaking generally, the rivers afford little assistance. The Murray is navigable for 1066 miles to Echuca. The Darling, Murrumbidgee, and the lower courses of the eastern coastal rivers are navigable for short sections. On the inland courses traffic is chiefly in wool.

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Airways. The thin population and wide spaces of Australia, combined with favourable atmospheric conditions, offer great scope for communication by air. Already there are some 9000 miles of regular routes, with a weekly service between Brisbane and Cloncurry, Brisbane and Daly Waters, Melbourne and Hay, Adelaide and Mildura, Adelaide and Broken Hill; also from Perth northward along the coast, and in addition to Adelaide. An air-mail service between England and Australia, *via* India, Singapore, and Darwin, is under experiment.

CHAPTER XXXII

NEW ZEALAND

OVER one thousand miles to the east of Tasmania, New Zealand extends from the latitude of Sydney to some 250 miles farther south than Tasmania, a distance of nearly a thousand miles. The North Island is about three-quarters of the area of the South Island, and Cook Strait, which separates them, is but the width of the Strait of Dover. Their joint area is about twice that of England and Wales, but they lie between latitudes 34° – 47° S., as compared with 50° and 59° N. They are, therefore, both longer than the British Isles, and nearer the equator, their middle latitude being 40° —*i.e.*, the latitude of Southern Italy. In short, they are the antipodes of the Bay of Biscay, Spain, and Tangier. In general, the summer climate is similar to that of Britain, but the winters are not so cold.

The islands are much more mountainous than Britain. In the North Island, along the east coast, the Kaimanawa Range is mostly over a mile high, with Mount Ruapehu, the cone of an almost extinct volcano, rising to over 9000 feet. To the west of the highlands is a wonderful volcanic region, with volcanoes—one of which, Tongariro (6458 feet), is still active—geysers, lakes actually boiling in parts, hot springs, and mud baths. In the middle of the island is Lake Taupo, over 230 square miles in area, drained by the river Waikato. To the north of the lake, in the Rotorua district, is the greatest geyser area known. The last great eruption in this region was in 1886, when the famous 'pink terraces' formed by deposits from the hot springs disappeared, and destruction to life and property took place. The largest lowland is between

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Auckland and the lake region. To the south-west Mount Egmont, an extinct volcanic cone, rises in solitary grandeur to over 8000 feet. In the South Island the mountains cross to the west coast, forming a barrier backbone, eighty miles broad in places, with many peaks over 10,000 feet. This mighty chain separates Westland from

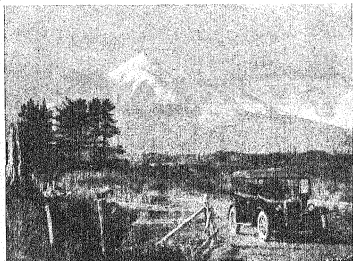


FIG. 249. MOUNT EGMONT

Note the forest cleared for dairying.

By courtesy of the High Commissioner for New Zealand

the Canterbury Plains. These mountains have many peaks clad with snow and glaciers; the highest peak is named Mount Cook (12,349 feet). Farther south is Mount Aspiring (9975 feet). They are well-named Southern Alps, for, like the Alps, they are geologically recent, and their valleys, deepened by glaciers, contain long, narrow lakes, waterfalls descending from hanging valleys, deep gorges, rushing glacier streams, and all the natural Alpine features. To the south, the mountains form the west coast, and are

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cut by some thirteen deep fjords, penetrating far inland. Glaciers descend to within a few hundred feet of the sea. Milford Sound, the most famous, equals the Norwegian fjords in grandeur.

The largest lakes are Te Anau (132 square miles), drained by the Waiau river, Wakatipu (112 square miles),

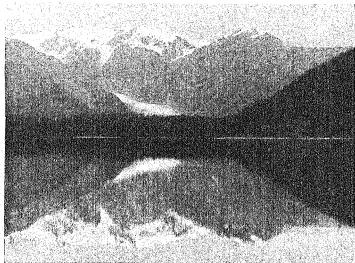


FIG. 250. FRANZ JOSEF GLACIER, FROM LAKE MATOURIKA

By courtesy of the High Commissioner for New Zealand

and Ellesmere on Banks Peninsula (108 square miles). Most of the rivers, fed by heavy rains, carry much sediment, which is deposited along their lower valleys, except when they flow through lakes. Only their lower courses are navigable, and those parts for short distances only, although they are wide rivers compared with their length. The only rivers useful for modern transport are found in the North Island, the chief of which is the river Waikato. But the Clutha in the South Island carries the greatest volume of water.

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Climate and Productions. The islands lie in the area of variable winds, chiefly westerlies. No part is shut off from the sea. Temperatures therefore vary but little (about 15° F.) between summer and winter, but the difference between the North and South of the Dominion is about 13° at each season. While the summer temperatures are similar to those of Britain, the winter is warmer, because New Zealand is oceanic, not close to a continent, and has deep, not shallow, seas surrounding it.

The South Island lies in the path of the 'Roaring Forties' throughout the year. These deposit very heavy rain on the western flanks of the mountains, for their height lowers the air temperature between 10° and 20° F. South of Westport there is a rainfall of between 100 and 200 inches a year, with a mid-winter (July) maximum. But having crossed the range the air is compressed and warmed by descent, so that rainfall rapidly decreases, as in Canada and Patagonia, and the eastern plains receive from 20 to 25 inches only.

Most of the North Island is under the influence of the westerlies only in winter. In summer, calms and light breezes prevail, but occasionally south-east winds (trades) are felt, and the eastern side, being mountainous, gets heavy rainstorms. In winter, however, the westerlies distribute moderate rainfall over the open country in the west (30 to 50 inches), but the eastern highlands receive over 70 inches. As in Tasmania, there are no parts subject to drought.

The North Island, being warmer, less windy, and possessing a more uniform rainfall, is ideal for temperate forests. The lowland forests have the character of the true tropical rain-forest: stately pines, notably the kauri (not the karri eucalyptus), and many other huge trees grow luxuriously, and the abundance of tree-ferns, sometimes 40 feet high, climbers, shrubs, mosses, and even palms makes the forests difficult to penetrate. At the same time there are few flowering plants. The forest thins out

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to the south as the rainfall decreases. But on the western slopes of the Southern Alps are large forest areas containing evergreen beech and the soft woods red and white pine. These forests are more open than the northern forests. The original forest area has been much reduced since the middle of the last century. But about 19 per cent. of the total area is still forest. East of the mountains patches of forest are found only in the upper valleys. The wind-swept plains have only low, scattered trees and wiry grasses, and may be termed prairie or steppe land, except that the winter is not severe.

In marshy parts, in both the North and the South Island, the flax plant (phormium) grows wild, and is also cultivated. The fibres of its long, grassy leaves, which grow to the height of a man, are collected and used in commerce for rope- and mat-making. The Maoris make clothing from it.

New Zealand, even more isolated than Australia, had some animals characteristic of the earliest geological times, but these, although akin to Australian types, were found to be far fewer in number. The only mammals were seals and two kinds of bat. The Maori dogs and rats once thought to be indigenous were probably introduced by the Maori. The former is now extinct. No eucalyptus or acacia were found; there were also few flowering plants, but many types of fern. The natural flora and fauna was remarkably poor, but, as in Australia, European animals and birds have established themselves.

But if the animal and plant life was poorer than that of Australia, the native inhabitants proved to be immensely superior to their Australian neighbours. The Maoris, who number about 67,000, are of fine physique, and are thought to have come from the Pacific Islands some five or six centuries before the islands were discovered by the Dutchman Tasman in 1642. This brown, stalwart race, with their faces tattooed with intricate designs to mark their tribe and status, were skilled oarsmen and craftsmen in

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wood, but not in metal, and for some time they fought fiercely against the white intruders. Later, they accepted the new conditions, but at first their numbers declined through contracting diseases and bad habits in their changed mode of life. But being an intelligent race they responded to the education provided for them, and they are now a flourishing part of the community, found in all

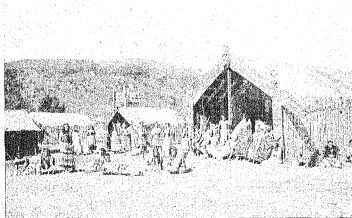


FIG. 251. A MAORI VILLAGE

By courtesy of the High Commissioner for New Zealand

walks of life, and having their own representatives in the New Zealand Parliament. The white inhabitants, numbering nearly 1,500,000, are of selected British stock, chiefly English, though with large Scottish, Irish, and Welsh leavening. Particular care from the earliest days was made in the selection of emigrants to this Dominion. The people have proved themselves resourceful and energetic, so that New Zealanders are justly proud of their progress and prosperity.

Livestock. Sheep-rearing, introduced from Australia, was the first, and for some time, almost the only industry.

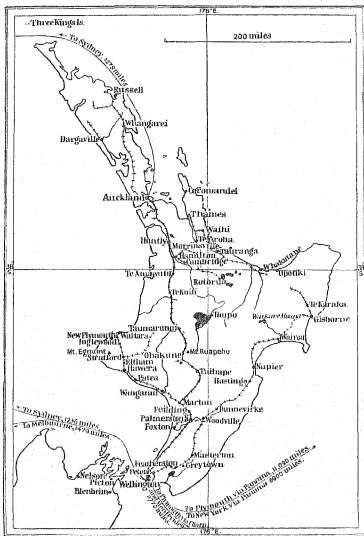


FIG. 252. THE NORTH ISLAND: RAILWAY DEVELOPMENT

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It still remains the most important, but cattle-grazing, agriculture, and manufacturing are now competing strongly. New Zealand sheep are bred both for the quality of the mutton and for wool, the production of which has increased since the War. Of the 30,000,000 sheep, the North Island has rather more than half; the chief areas being the plains along the coast beyond Wellington, round Napier and Gisborne, and the Auckland plains; and in the South Island the Canterbury Plains, Otago, and Southland. Transport was a great problem. The meat, as from Argentina, has to cross the equator to reach the European market, but the distance is doubled. Cold storage, both while awaiting shipment and throughout the voyage, is essential, and vessels are specially constructed to maintain an even temperature. Mutton keeps better than beef under these temperatures during such a long voyage, so that cattle are bred chiefly for dairy purposes. Out of a total of 3,700,000 cattle, nearly 1,500,000 are dairy cows. Native grasses have been burnt off and better kinds sown. The dairy pastures are the Auckland plains, the Taranaki and Wellington districts in the North Island, and in the Otago and Southland districts of South Island. Large quantities of butter, cheese, milk, dried and condensed, hides, and meat are exported. The present production of butter is over five times, and cheese nearly three times, that of pre-War figures. The whole industry is organized on the most scientific lines, and the quality maintained is of the highest.

Agriculture is carried on mainly for home needs. The dry climate of the Canterbury Plains is suitable for wheat and oats, and the production of wheat is increasing. In the North Island maize, round the Bay of Plenty, and flax are cultivated, but fruits—grapes, oranges, lemons, and other Mediterranean kinds—are more important. Apples, pears, and plums do best in the South Island, and are exported to Britain and South America. Poultry and bee-keeping are also extensively practised. From the

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forests, the timber of the kauri-pine is a valuable product for constructional work, and its gum is used for varnish-making, while soft woods from the South Island are exported to Australia. But the imports of timber (chiefly Oregon pine and Australian hardwoods) exceed the exports.

Mining and Manufacturing. There is considerable coal, but it is mainly of the lignite type. It is found in the North Auckland Peninsula, in Waikato valley at Huntly (near Hamilton), and at New Plymouth. But the chief area is the Brunner field, in the north of Westland. The coal exported from Greymouth and Westport is of good quality as steam coal. There is coal also round Dunedin, and near Lyttelton on the Canterbury Plains. Of the coal locally produced, New Zealand consumes about 2,250,000 tons a year, exporting only 125,000 tons. The Dominion Government is spending large sums of money developing hydro-electric power, which now supplies virtually the requirements of the two islands.

The production of gold, as in Australia, is declining in value. It is worked both in alluvial deposits and in the quartz reefs, the latter being the richer. Reefton, near Westport, the river valleys of Westland between Ross and Greymouth, and the Clutha valley in Otago, in the South Island, and the Coromandel peninsula east of Hauraki Gulf, in the North Island, are the chief sources of supply. Supplies of silver are also falling. Other metals are known to be present, but the only ones being worked are tungsten and manganese.

Manufactures are steadily growing, both in the number of people employed and in value. The important meat-freezing works and the butter, cheese, and condensed milk factories are by far the most remunerative. Next to these the products of sawmills and carpentry, printing and book-binding, woollen goods, leather, and shoe factories, flour-mills and breweries, engineering and motor works, have the highest values in output. As power production is

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developed, the Dominion will become increasingly self-supporting, but there are many things of which both the Mother Country and the Dominion will mutually stand in need.

Auckland is like Sydney, both the oldest settlement and the largest city (213,000). It stands on a site of great natural beauty—an isthmus, five miles wide, between harbours on two seas, overlooked by many old volcanic cones. Waitemata, the eastern harbour, is the better, and has one of the largest docks in the world. Manukau, on the west, is shallow and almost land-locked. Auckland exports the gold and silver from Waihi and Coromandel, coastwise coal from the Waikato valley, kauri timber and gums from the north, as well as fruit and dairy produce from the whole area. Coal supplies power for local saw-mills, flax-mills, and fruit factories. It is linked by the Main Trunk Railway to Wellington *via* the Waikato valley and the King Country.

Wellington (138,000) is the capital, centre of Government, and chief port. Port Nicholson, with its fine, sheltered harbour, has the advantage of a central position, and liners from Britain and Australia bound for Canada and the United States call regularly. The Panama Canal provides the shorter and quicker route. The city has a flourishing university and other educational institutions, a number of fine buildings, both public and commercial, many of which are built of timber, spacious parks, and a big botanical garden. It acts as a collecting market for the pastoral hinterland and consequently exports wool, frozen meat, hides, and dairy produce, and has woollen mills and vast cold-storage premises. Railways run to the north-west, to the fertile Wanganui valley, which has the port of Wanganui at its mouth, and to New Plymouth; and to the north through the dairy and agricultural districts, through the towns Greytown and Masterton to Napier, in the Hawke's Bay district, a town which exports wool, frozen meat, and fruit. Palmerston North is a centre of

NEW ZEALAND

the flax industry, but is also surrounded with fertile sheep and dairy cattle lands. The Napier district recently

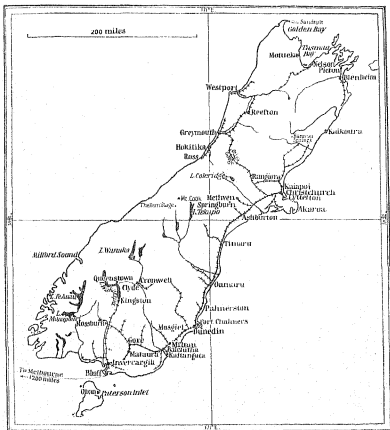


FIG. 253. THE SOUTH ISLAND: RAILWAY DEVELOPMENT

suffered a devastating earthquake, but rapid reconstruction is in progress.

Christchurch (126,000) is the third largest city. It is

THE COUNTRIES OF THE WORLD

the centre and capital of the rich Canterbury province. Railways follow the plain to the north and south and another threads the mountains by Arthur's Pass (3100 feet), using a long tunnel under the Otira gorge to Grey-mouth. Originally a Church of England settlement, it has now both a Protestant and Roman Catholic Cathedral, fine schools, public buildings, and parks. The port of

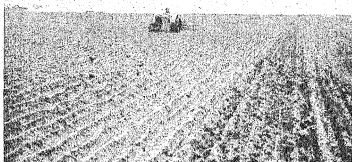


FIG. 254. HARROWING ON THE CANTERBURY PLAIN

By courtesy of the High Commissioner for New Zealand

Lyttelton lies eight miles away, with a good harbour on the northern shore of Banks Peninsula. Wool, meat, and dairy products are exported overseas, and wheat coast-wise.

The name of Dunedin (85,000), in the south, reminds us of the early Scottish settlers. It is similarly situated on a peninsula, with anchorage along the city front at the head of Otago Harbour. As it is rather shallow, Port Chalmers, nearer the mouth of the harbour, has wharves for the larger vessels, and its trade is not far short of Lyttelton's in value. Being the outlet for Otago province,

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with its cattle and sheep, its fruit and wheat crops, and its coal, it has all the typical New Zealand industries and exports. Railways follow the coast, and others strike inland *via* the Clutha and Taieri valleys for the holiday resorts amid the 'cold lakes' of the mountains.

Invercargill (24,000), with its port, Campbelltown, on Bluff harbour, fifteen miles away, is the outlet for Southland, a district which has the climate and products of West Scotland. Its trade in wool, timber, fish, and dairy produce is considerable. Across the stormy Foveaux Strait lies Stewart Island, about 600 square miles in area, a centre for fishing and oysters.

A number of smaller ports engage in coastal traffic, but Westport and Greymouth deal with the important trade in minerals and timber. Nelson exports fruit and dairy produce to Wellington, and Picton has frozen mutton and fishing industries.

In addition to the principal islands, the Dominion of New Zealand controls a number of small outlying and annexed islands of the Southern Pacific, and also, under the mandate of the League of Nations, Western Samoa. The Dominion shares with the Imperial Government and Australia the mandate over the Island of Nauru, valuable for its phosphates.

CHAPTER XXXIII

THE MALAY ARCHIPELAGO

BETWEEN Australia and Asia lie the 'continental' islands of the East Indies. They may be grouped as follows:

- (1) The western chain of islands—Sumatra, Java, and the smaller Sunda islands—continuing the line of mountains, which throughout rise steeply from deep sea on the western oceanic side, with lowlands to the north-east.
- (2) The eastern Pacific chain of islands—Philippines and Moluccas—with deep seas on both sides, converging to meet the western chain.
- (3) The islands enclosed between them—Borneo, on the Asiatic continental shelf, and Celebes, separated from Borneo by the deep Macassar Strait.

All these islands are mainly relics of Tertiary foldings, and many have volcanic rocks. Wallace, the great naturalist, divided the islands by a line passing between Bali and Lombok through Macassar Strait, keeping south of the Philippines, because he found that the birds and mammals on the islands to the west were similar to those of southern Asia, while those to the east had Australian characteristics. But, as in the case of all boundaries, whether political, vegetational, or climatic, there is a zone of transition from the one to the other.

Sumatra, Java, most of Borneo, Celebes, the Moluccas (Spice Islands), and western New Guinea, are all Dutch. The Philippines are American. The Portuguese retain part of Timor. The British have part of Borneo and eastern New Guinea. The Portuguese, in the fifteenth century, were the first to reach these islands, following the

THE MALAY ARCHIPELAGO

route round Africa. Spain then approached from the Cape Horn direction to take possession of the Philippines, until 1898, when they passed to the United States.

The Dutch in the sixteenth century set up many trading stations. The British, jealous of the lucrative trade in spices, and finding themselves forestalled, turned to India

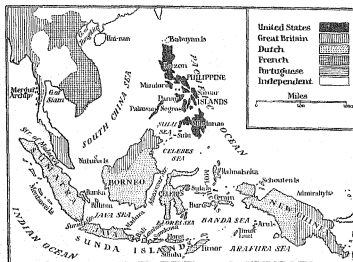


FIG. 255. THE MALAY ARCHIPELAGO: FOREIGN POSSESSIONS

as the next best thing. It will be noted that the Powers concerned have all possessed at various times superiority in sea-power, upon which control of the archipelago depends. For this reason key positions guarding the main gateways are very important. Singapore (British) watches the chief approach through the Malacca Strait. Batavia (Dutch) guards the Sunda Strait; Manila, on the west of the Philippines (U.S.A.), the approach from the north-east.

It is difficult to realize now what risks were run, and

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how profitable the trade in spices proved. Although their value has declined, pepper, ginger, cloves, and cinnamon are still important in commerce, and they are found only in equatorial regions where there is high uniform temperature and rain throughout the year. But the presence of high mountains and rich volcanic soil enables a wide range of other products to be grown. Coconut, rubber, rice,



FIG. 256. VOLCANIC CRATERS IN JAVA

Photo E.N.A.

sugar, coffee, cotton, quinine, and even temperate cereals, besides the valuable timber of the forests—teak, ebony, and sandalwood—are obtained, and the mountains yield minerals, especially tin, petroleum, and gold. Agriculture diminishes eastward in the archipelago, the sago-palm providing an easier form of food-supply.

Java is as densely populated as England, for the population and the area are both a little larger. The total population of 37,434,000 constitutes half the population of the whole archipelago. The density reaches the sur-

THE MALAY ARCHIPELAGO

prising figure of 737 per square mile. The volcanic soil is amazingly fertile, for Java has a long range of volcanoes. The equable, hot, moist climate enables crops to be harvested throughout the year, providing an abundance of



FIG. 257. FLOODED RICE-FIELDS IN THE PLAINS OF JAVA

Photo E.N.A.

the staple foods, rice and sago. Nearly half the island is under close cultivation. The Dutch very skilfully organize employment, the methods of agriculture, and the marketing of the produce. The rotation of crops—sugar-cane, beans, maize, rice, sugar—saves the soil from being impoverished. For many products it is the second most important region of export in the world; for example,

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coffee 114,000 tons (next to Brazil), sugar-cane 2,900,000 tons (after Cuba), tea 75,000 tons (after India). In addition there is a great rice harvest. Over 7,500,000 acres under irrigation and a further 1,000,000 acres not irrigated, are devoted to this crop. The plantations of cinchona-trees, introduced from Peru, produce the bulk of the world's supply of quinine extracted from the bark. In addition tobacco export reaches 65,000 tons. Maize, fibres, and other crops are grown on a large scale, and valuable supplies of timber, tin, coal, and petroleum are obtained. The area under rubber is increasing, and production exceeds 260,000 tons. Most of the exports are sent to Holland, where they are sold by auction to buyers from all countries.

Batavia, the capital and port for this Dutch possession, has a central position on a river mouth of the coastal plain in the north-west. Railways and good roads run to all parts of the island. With its modern residential town on the hill-slopes to the south, its fine port, and its great trade in coffee and all the products of the hinterland, it is the Rio de Janeiro of the East. Canals, constructed with typical Dutch skill, unite the port and the lower towns. Surabaya, the chief port, in the east of the island, serves a great sugar-growing region.

In Sunda Strait are the remains of the island volcano of Krakatoa. In 1883 half the island was blown away in a great eruption. The noise of the explosion was heard 2000 miles away. The sea-waves produced were felt on far distant shores of America (they rose fifty feet on adjacent shores), and 35,000 people perished. The finest dust was distributed all round the world by air-currents, and took two or three years to settle.

Sumatra is over three times the size of Java, but has less than one-sixth of the population. Its 1000-mile length is cut by the equator, so that seasons are opposite in the north and south. The lowland plains are unhealthy, but on the mountain-slopes, over 3000 feet high, the

THE MALAY ARCHIPELAGO

climate is pleasant. The island bears much forest. The orang-utan has its home here, and may be compared with the gorilla of West Africa and the gibbon of south-east Asia, but the gorilla is shorter in the arm. After man they are the highest forms of life. Their food is almost entirely fruit and vegetables. Productions are similar to those of Java, but the quantities are much smaller. Rubber, oil, and tobacco deserve special mention.

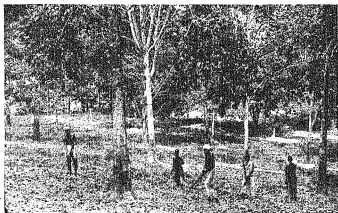


FIG. 258. A RUBBER PLANTATION IN MALAYA
By courtesy of Messrs. Guthrie and Co., Ltd., East India merchants

The islands of **Banka** and **Billiton** supply two-thirds of the world's output of tin. The Government owns most of the mines of the islands, which produce over 30,000 tons of tin annually. **Borneo** has the advantage of being free from earthquakes and volcanoes, but its radiating mountain system separates almost completely the various river valleys. The interior is inhabited by the head-hunting Dyaks. Their head-hunting excursions were undertaken more to prove their prowess in the eyes of prospective brides than for blood-thirst. A feature of the tribal life is the living together of the married men in a large bamboo

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hut, which serves as a kind of club. Some of these huts are 400 feet long, with a floor resting on piles ten feet above the ground, the arched roof of palm thatch being sixty feet high. The women and children live in small huts. Fishing and hunting are the chief occupations, but rice and sugar are grown in a primitive way, and they barter daggers (kris) and ornaments. Round the coasts are mixed populations of Chinese, Malays, and Arabs. Borneo is still little developed; tobacco, sugar, and pepper, together with forest products like rubber and edible birds'-nests (for Chinese consumption), form the chief export trade. The north part is British, and enjoys a cooler climate, with less heavy rain.

Celebes is formed entirely of mountains, radiating from a central mass. It has very fertile soil. Most of the island is inaccessible and inhabited by Malays, who are virtually independent. Copra and macassar oil are exported. Macassar, on the south-west coast, is the chief Dutch settlement, dating from 1618, and the market for native produce.

The **Moluccas** are the famous spice islands. The spices are obtained from the nutmeg, clove, and cardamom trees. The sago-palm, from the pith of which a native can obtain enough sago in a month to keep him for a year, grows in great profusion. The town of Amboyna, on one of the healthiest islands, is the chief collecting centre for Dutch traders.

The **Sunda Islands**, east of Lombok Island, are drier, and are akin to north Australia in many ways. They are still but little known. Portuguese Timor produces excellent coffee.

The **Philippines** consist of some 7000 islands, with a total area rather more than that of the British Isles, the largest (Luzon) being nearly as large as England, and Mindanao rather larger than Ireland. The estimated population is 12,000,000. Since they were acquired by the United States, the standard of living of the Filipinos

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has risen considerably, so that the demand for manufactured goods is increasing. The opening of the Panama Canal in 1914 has favoured trade between the islands and the United States.

Lying within the tropics, and under the influence of the Asiatic monsoon, with high mountains and volcanoes, the

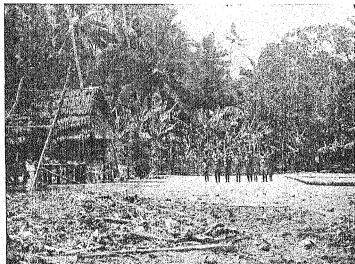


FIG. 259. COPRA-DRYING GROUND, PAPUA

Photo E.N.A.

islands have a high temperature, heavy rainfall, and experience conditions which favour the growth of rice, hemp, coconuts, sugar, and tobacco. The forests produce ebony and dyewoods, gums, cedar, and bamboo. Manila (285,000), the chief centre of the islands, is on the west coast of Luzon. Its command of routes, its natural harbour sheltered from destructive cyclonic storms of great intensity, known as typhoons, the coalfield to the south-west, and the dense population on the fertile hinterland

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account for its importance. Sugar, coconut oil, manila hemp, copra, and tobacco are exported.

New Guinea, like Tasmania, is separated from Australia by shallow seas, and both were probably part of the continent originally. The western half is under Dutch protection, the eastern portion is British. The northern part of this half is under Australian mandate. Papua, the southern part, has very few white men. The natives are fierce, and live under similar conditions to the natives of Borneo. Port Moresby is the chief centre, with native settlements round it. Plantations of rubber, sago and coconut-palm, and hemp do well. Gold-mining and pearl-fishing are the other occupations. Most of the trade is with Queensland.

CHAPTER XXXIV

THE PACIFIC

ONLY a study of the globe can convey an adequate idea of the size of this vast ocean, extending from north to south over a third of the world's circumference, with a width at the equator of 11,000 miles. Its area is greater than all the land of the world. Unlike the Atlantic, its coasts are mountainous, and some 200 volcanoes occur along its shores, rising out of deep seas. The area drained by rivers flowing into it is less than half that of rivers along the Atlantic coasts—the chief being the Columbia, Fraser, and Yukon of North America, the Yang-tse-kiang, Hwang-ho, and Si-kiang from China. There is no central divide. But from Central America a broad ridge runs south-west, and there are several narrow submarine plateaux, from which rise numerous islands, mostly volcanic.

Half the known 'deeps' are found in this ocean. The best known are the Tuscarora and Nero Deeps, near the Asiatic coast, the Planet Deep, near New Guinea, the Kermadec Deep, near New Zealand, and the Atacama Deep, off South America. The greatest known depth is the Emden trench in the Philippine Deep, off the Philippines, over 35,400 feet. But the bed of the ocean for the greater part is a vast plain at an average depth of two and a half miles. The greatest areas of shallow water occur in the west, near the greatest deeps, for festoons of islands fringe the Asiatic coast, enclosing the seas of Okhotsk, Japan, East China, and South China. But south of the equator there is none of any size.

The ocean currents are thus much less impeded by projecting land masses than in the Atlantic. The equatorial current moves westward, to become the warm Kuro

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Siwo or Japan Current, corresponding to the Gulf Stream. The general rotation is the same, clockwise north of the equator and counter-clockwise south of it. This produces the cold Humboldt Current, moving northward off the coast of South America, corresponding to the Benguela Current, off the west coast of Africa. But the monsoon winds cause some variations at different seasons.

The islands of the South Pacific ('South Sea') are in-

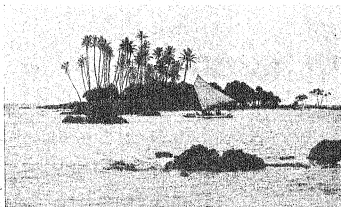


FIG. 260. A SMALL ATOLL IN HILO BAY, HAWAII

Photo E.N.A.

numerable. They are sometimes classified as Melanesia (islands with black inhabitants), Micronesia (small islands), and Polynesia (many islands), these groups occupying the west, north and centre, and east of the Ocean respectively. Most of them are controlled by one or other of the Great Powers, some jointly by two Powers. Thus of the islands east of Australia, the Solomon Islands, Tonga, and Fiji, are British, New Caledonia, Tahiti, and the Marquesas are French. North of the equator, the Marshall and Caroline groups are Japanese, and the Hawaiian group is American. New Zealand controls the Chatham and Auckland Islands,

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Cook, part of Samoa, and other islands. The New Hebrides are British and French; New Guinea is British, Australian, and Dutch; Guam and part of Samoa are American. The mandate of Nauru Island is shared by the British, Australian, and New Zealand Governments.

With the exception of New Caledonia, these islands are either high volcanic cones, like Fiji and Hawaii, or low coral islands, and are spoken of as 'high' or 'low.' Most of the high islands have coral reefs around their shores, either as fringing reefs, with only a mile or two of clear, shallow water between them and the coast, or as barrier reefs, as in Australia, where the channel is both deep and broad. The coral islands rise only a few feet above sea-level. Elizabethan sailors who first named them 'low islands' thought they grew up from the bottom of the sea, but we

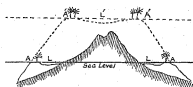


FIG. 261. DIAGRAM ILLUSTRATING
THE FORMATION OF AN ATOLL

AA, fringing reef formed when volcano rises well above the surface, enclosing lagoon, *LL*. Submergence with coral growth proceeding concurrently would lead to the development of a barrier reef and ultimately to an atoll of annular shape, *A'A'*, enclosing lagoon, *L'L*.

now know that the polyp which secretes the limestone forming the coral, will not live in water more than 600 feet deep, nor where temperature falls below 68° F., and that it needs clear water and the microscopic food brought by currents. But borings reveal coral down to at least 1200 feet. To meet the difficulty of coral at such a depth various interesting theories have been made. Facts gained by investigation favour Darwin's suggestion that the sea bottom has slowly subsided and that the coral continued to grow upward at the same rate. This satisfactorily accounts for the three forms of coral islands—viz., the island, with its fringing reef just below tide-level, and gaps opposite the mouths of the rivers; the barrier reef, when the island has partly and slowly submerged;

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and the atoll—the fairy-ring of coral, enclosing a shallow lagoon, varying in breadth from yards to miles, when the island is completely submerged. Changes in the level of the ocean since the Great Ice Age have also played a part. Coral reaching the surface gets broken off and piled up by waves. It crumbles to form a soil on which coconuts, which will float in sea-water for long distances without harm, or seeds dropped by birds take root. The Ellice and Cook Islands provide examples of the various types of coral islands. These low islands often have new reefs of young coral round their shores.

The climate of these oceanic islands is on the whole very pleasant, always warm, but tempered by sea breezes, with adequate rain, particularly on the high islands. This, where combined with the volcanic soil, makes them very fertile. The banana and coconut are found everywhere near the coast. Dense forests crowd the windward slopes. Plantations of various tropical crops and fruits, sugar-cane, pineapple, coffee, cotton, and tobacco, as well as cattle and other animals, have been introduced in some of the islands. Some have deposits of guano rich in phosphates. Nauru Island, just south of the equator, is very important in this respect. The islands also play an important part in the life of the world in other ways—supplying fresh water and fruits to ships and serving as coal stores and cable and wireless stations.

The Fiji Islands. Suva, the capital of the picturesque Fiji Islands, is one such station. The Fiji group consists of about 250 islands, only a third of which are inhabited. Of the total area, which is about 7000 square miles, Viti Levu is over 4000 square miles and Vanua Levu over 2000 square miles. Rotuma Island, some distance off to the north, is added to the colony. The total population approaches 200,000, including nearly 5000 Europeans and 70,000 Indians. At Suva, the coral reef acts as an excellent breakwater to the harbour. Sugar, copra, bananas, and rum are exported. The natives look eagerly for such

THE PACIFIC

imports as drapery goods, tinned meats, biscuits, and petroleum for their oil-lamps. Like many of the islanders, the Fijians avoid work as much as possible, and Indian coolies were introduced to work the plantations.

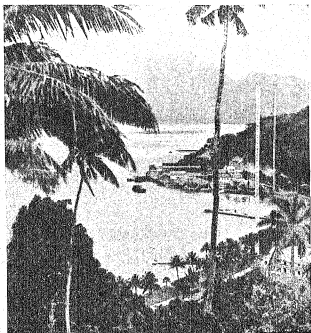


FIG. 262. THE RADIO STATION, PAGO PAGO, TUTUILA,
AMERICAN SAMOA

Photo E.N.A.

Other important commercial and strategic centres are Apia, in Samoa, Raratonga, in the Cook Islands, Pago Pago, in Tutuila, and Honolulu, in Hawaii.

Samoa is situated about 500 miles north-east of Fiji. Western Samoa, under New Zealand mandate, consists of nine volcanic islands, surrounded by coral reefs. Apia is

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the port for Upolu (430 square miles). The total population is about 44,000. Copra and cacao are the chief products, and bananas are exported to New Zealand. The total area of American Samoa is approximately sixty square miles, and the population about 9000. The chief island is Tutuila, with its important naval station, Pago Pago.

Hawaii (Sandwich Islands). This group, with a total

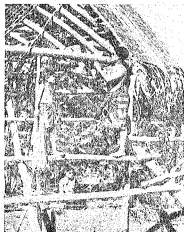


FIG. 263. MAKING A HOUSE IN AMERICAN SAMOA

Photo E.N.A.

area similar to that of Fiji, lies between latitudes 18° - 21° N. and longitudes 150° - 160° W. Hawaii (4015 square miles) is the principal island, but the capital, Honolulu, is on the south coast of Oahu (600 square miles). The islands lie at the cross-roads of the Pacific, 2000 miles from California, the nearest land. Note the ocean routes from Honolulu: to San Francisco (2040 miles), Panama (4685 miles), Valparaiso (5900 miles), Samoa (2280 miles), Sydney (4650 miles), Philippines (4770 miles), Shanghai (4330 miles), Yokohama (3400 miles), and Seattle (2400 miles).

THE PACIFIC

miles). They are typical volcanic islands, rising out of deep water and extending in a line nearly 1500 miles. Hawaii contains the interesting volcanoes Mauna Loa (13,675 feet) and Kilauea (4090 feet). Although the two



FIG. 264. PART OF THE CRATER OF KILAUEA

Photo Will F. Taylor

are within twenty miles of each other, when one is disturbed the other is not. The reason for this hydrostatic paradox is not known. Their commanding position, magnificent scenery, wonderful climate and flora, and the regular steamer service between the islands, together with splendid roads on the four largest islands, all go to make this group the most important in the Pacific—for the

THE COUNTRIES OF THE WORLD

United States at least. And the islands are regarded not as a possession, but as a Territory with a Legislature of two Houses and representation in Congress.

There is an amazing mixture of races. More than a third of the population, numbering 360,000, are Japanese, and more than a third also reside in Honolulu. The Hawaiian mountains, rising to nearly 14,000 feet, result

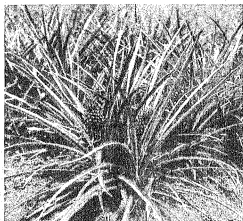


FIG. 265. A PINEAPPLE PLANT

By courtesy of the Royal Mail Steam Packet Co.

in a great variety of climate. The trade-winds bring exceedingly heavy rainfall to the windward slopes, one place claiming an annual rainfall of 476 inches, which exceeds that of Cherrapunji. But a few miles away, on the other side of the mountains, the rainfall is only 22 inches. Temperatures never vary more than seven or eight degrees from the mean annual, which is 75° F. Great crops of cane-sugar and pineapples are grown for export. In 1929 914,000 tons of sugar were produced. The yield per acre is double that of Cuba, and the sugar-content higher. The value of the export of pineapples in 1928 was 608

THE PACIFIC

over £8,000,000 out of the total of exports worth £24,000,000. The other exports are chiefly coffee, bananas, and hides. The imports consist mainly of wheat, flour, and pork.

Shipping routes across the Pacific may be grouped as follows:

- (a) From Hong Kong, Shanghai, and Japanese ports to (1) Vancouver and Seattle, (2) to San Francisco and Panama.
- (b) From Australian ports *via* Auckland or Wellington to Panama.
- (c) From Australian and New Zealand ports *via* Fiji or Samoa and Honolulu to San Francisco and Vancouver.

PART V

ASIA

CHAPTER XXXV

GENERAL—RUSSIAN ASIA

FROM the human aspect Australia is the youngest of the continents, while Asia is the oldest. Asia was probably the nursery of the human race. But although Asia is five times as large as Australia, and has a hundred times as many people, much greater mineral wealth and agricultural fertility, the commercial prosperity of its countries is less. The reason lies in the difference of racial characteristics. As a consequence the countries of Asia are chiefly productive of raw materials. Manufacture in the European sense is carried on only in Japan, and to some extent in India, but China is beginning to awaken in this respect. Asia, therefore, offers an important market for manufactured goods, for although the purchasing power per head is small, numbers make the amount considerable.

The two continents, Asia and Australia, are similar in certain respects. In both the richest and most populated parts are on the east and south. Both have large desert areas in the west cut by the tropics. This desert area isolated the monsoon lands from Europe, as did the Sahara in Africa or the Australian desert. Contact with Europe was, and is, chiefly by sea. But the east-west trend of the mountains in the interior of Asia contrasts with the north-south coastal range of Australia. This, as well as the greater area, causes climatic differences.

Physical Features. The main mountain systems run

ASIA—GENERAL

east and west as in Europe. They consist of lofty ranges converging and diverging at certain parts.

- (1) The Pontic and Taurus ranges enclose the plateau of Asia Minor, meeting in Armenia.
- (2) From Armenia the Elburz and Hindu Kush, on the north, the Zagros range, on the south, and the Kirthar and Sulaimans, on the east, enclose Iran, and meet again in the Pamirs.
- (3) From the Pamirs, the Tien Shan and Kuen-lun ranges enclose the Tarim basin; the Kuen-lun and Himalaya enclose the plateau of Tibet.

Reaching away to the north-east are a series of ranges—Khingan, Yablonoi, and Stanovoi mountains, and several lower ranges in China and Manchuria.

The main ranges from the Pontic and the Taurus, in the west, to the Himalayas and the Arakan Hills of Burma are folded mountains of the same age and origin as the Alps and other great ranges of southern Europe. The other ranges in the east and north-east, as well as several that cut across these courses, such as the Altai and the Sayan, are all much older, and lie in an area of Asia where heavy faulting has occurred. The Pacific edge of Asia is a faulted edge of this old broken plateau. The islands of Japan and other festoons of islands along the coast are partly drowned folded ranges, which show many volcanoes and partly faulted ranges. To the north and north-west of the area of mountains and plateaux lie the great plains of central Asia and western Siberia, reaching in the south to the Caspian Sea and in the north to the Arctic Ocean. They merge into the plains of European Russia.

To the south are the three peninsulas, the plateaux of Arabia and the Deccan, and the Malay peninsula. They compare readily with Spain, Italy, and the Balkan Peninsula in Europe. Arabia and the Deccan are probably remnants of a land which once extended from Australia through Africa to Brazil. Note the important lowland

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valley of Mesopotamia and the Indo-Gangetic plain that separate Arabia and the Deccan respectively from the highlands to the east and north.

This relief of the land has an important effect upon the river system.

(1) The Siberian rivers, several of them between two



FIG. 266. THE CHIEF RIVERS OF ASIA

and three thousand miles long, receiving tributaries chiefly from the east, flow mostly over uniform plains, and would be of great value as routes if they did not flow to the Arctic and were not frozen in winter. They also flood in spring, as the ice in the upper reaches melts first. Their use is mainly for local navigation.

(a) The Ob rises in the Altai Mountains. Its chief tributary is the Irtysh, which rises on the south side of the Altai range and flows over 2300 miles before joining

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the Ob. Its tributaries from the Urals provide routes toward European Russia. Tomsk, Kainsk, Tobolsk, Omsk and several other trading centres are thus linked by waterways, the total length of which is several thousand miles. A little used canal joins the Ob to the Yenesei approximately along the parallel of latitude 59° N.

(b) The Yenesei flows for four hundred miles through western Mongolia and then almost due northward across Siberia to the Arctic Ocean. It is navigable to the foot of the Sayan Mountains. The Angara from Lake Baikal, the largest and deepest fresh-water lake in Asia, joins the main stream near Yeneseisk. On its banks, not far from Lake Baikal, is Irkutsk.

(c) The Lena also rises near Lake Baikal, and has many navigable tributaries, the Aldan providing a route toward Okhotsk.

(d) The Amur and its tributaries flow from the Khingan and Yablonoi Mountains to the sea near Sakhalin. It is the great waterway of a fertile region. Much of its course forms the Manchurian boundary. The Usuri provides a valley route to Vladivostok.

(2) The Caspian Sea, the Sea of Aral, which is fed by the Amu Daria (Oxus) and Syr Daria from the Pamirs and Tien Shan, and the Tarim and Gobi basins are all vast areas of inland drainage.

(3) The famous rivers Euphrates and Tigris, both over 1000 miles long, drain from the mountains in Armenia. Both have long navigable stretches.

(4) The Himalayas feed many mighty rivers. The Indus (1700 miles) and the Tsangpo, or Brahmaputra (1680 miles), rise near each other north of the Himalayas. They flow in opposite directions, as the Rhine and Rhône do in the Alps. Their magnificent gorges are due to the mountains being uplifted so slowly that they were able to maintain their courses by deepening their valleys as the mountains rose. The Sutlej, the main tributary of the sacred Ganges, also rises here, but cuts across the southern

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ranges to the plain. All these are important rivers in their lower courses for either irrigation, navigation, or both.

(5) From Eastern Tibet flow the Irrawaddy (1300 miles), Salwen (1750 miles), Menam (750 miles), Mekong (2600 miles), through parallel longitudinal valleys to the south. These parallel ridges and valleys are an effective barrier between India and China. The lower reaches are all navigable.

(6) Flowing eastward from the same region—in the Kuen-lun—are the Yang-tse-kiang (3400 miles) and the Hwang-ho (2600 miles). Both these, as well as the Amur, descend to the sea over successive fault escarpments by a series of rapids. All these rivers vary in volume, being highest in spring and early summer from melting snows, and lowest in autumn. The Yang-tse-kiang can be navigated by seagoing vessels far into the heart of China. The Hwang-ho is called 'China's Sorrow,' on account of disastrous floods. But the floods, though destructive, also bring down immense quantities of rich alluvial soil, and where controlled by irrigation are the source of much wealth. The same quality applies to most of the rivers mentioned in this section.

Climate. The great range of latitude (over 5000 miles from north to south) and of altitude (an average of over 3000 feet, with occasional heights of over 5 miles) are factors which produce every variation between great extremes of heat and cold.

In winter temperature falls northward toward a pole of cold at Verkhoyansk (400 feet) where -60°F. is the average January temperature, which is colder in all probability than at the North Pole.

In summer the heat centre is in North-west India and Baluchistan, where the average July temperatures are over 95°F. , and an area from Arabia to south-east China is over 86°F. , but allowance must be made for altitude. To the north of this area, temperatures decrease normally with higher latitudes.

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The winter cold produces a vast pool of dense air, marked by a high barometer. This pool of cold air gradually and slowly spreads downward and outward, even across Europe, expanding here and contracting there rather like a huge jelly-fish. Along its southern and eastern edges there is always a fringe of easterly winds, intensely cold and usually dry.

In summer, on the other hand, the barometer registers low pressure over the intensely hot area, indicating that the air is expanding and rising rapidly. This produces so strong an indraught of colder, heavier air from the surrounding oceans that even the south-east trades are drawn across the equator into China, Japan, and India, becoming the south and south-east monsoon in the former and the south-west monsoon in the latter.

As in Australia, rainfall has a more important effect upon settlement and production than temperature, and its seasonal distribution is more important than the mean annual amount. The chief fact to note is that little winter rain falls in Asia, except where mountains cause rising air currents, as along the Mediterranean coast, near the sea in the south-east, where rain falls at all seasons, and on the western side of Japan. The summer is the wet season in most parts, and rain is heaviest where mountain ranges are at right angles to direction of wind; for example, the Western Ghats and Burma. Only the interior lowlands, which are shut off by mountains, fail to get rain at this season.

Even cold, dry outflowing winds have to deposit the last vestige of moisture as they climb opposing heights, and even warm, wet inflowing winds pass over the low plain of Rajputana (Thar Desert) without having a drop of moisture condensed because relief is insufficient to produce a cooling effect; though they deposit 50,000 tons of water per acre on Punjab slopes after crossing the desert. The climatic areas may be classified as follows:

(1) The Arctic cold, dry area bounded roughly by the

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Arctic Circle. This has long, dark winters and short, mild summers, with a mean temperature near 50° F. in the warmest month, and a mean monthly rainfall never over 1 inch in the wettest month.

(2) The Siberian area, with severe winter cold (-50° to -60° F.), warm summers (50° to 70° F.)—*i.e.*, an extensive range of temperature of 100° F., which is greater in the east than in the west; summer rain from 1 inch to 2 inches per summer month.

(3) The small Mediterranean coast region, with winter rains and summer drought, but no low temperatures at any season.

(4) The central arid area. (a) The deserts of Arabia, Persia, and India, with intense summer heat, warm winters, and practically no rain—only occasional winter showers. (b) The central plateaux and depressions of Turan, Tarim, Gobi, and Tibet, with very cold winters, cool or hot summers, according to altitude, and only occasional rain in summer or snow in winter.

(5) The monsoon area, India and Indo-China and eastern coastal lands as far north as Manchuria and the Amur valley. The monsoons begin at different times in different parts, but everywhere the summers are hot and wet and the winters fairly warm and dry, except in the north, where they are cold and dry. At the change of seasons severe cyclones occur in the Indian Ocean, and typhoons in eastern waters. The only districts which receive rain during the winter monsoon are the extreme south-east of India, south-east China, and western Japan.

(6) The Malay (sub-equatorial) region, always warm and always wet, with two less wet rather than two dry seasons, rains being heaviest when the sun is at the zenith.

Vegetation and Animals. (1) The *tundra*, which is more extensive than in Europe, is treeless, nearly always frozen, with short, warm summers and floods from the melting snows. Flowering bulbous plants, shrubs of birch, larch, spruce, and berry-bearing bushes are the chief plants.

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The reindeer is the all-important animal, but many species of birds migrate there for breeding, and the mosquito is a universal pest.

(2) The *forests* are (a) coniferous on glacial and alluvial soils, as in Europe, but reaching much farther south; the chief animals are the fur-bearing animals, sable, ermine, fox, and squirrel; the elk, the brown bear, and the wolf. (b) Deciduous in the Amur basin and China, consisting chiefly of oak, elm, and maple trees. This forest merges in southern China into (c) monsoon evergreen forest, where there is some winter rainfall. The deodar, banyan, palm, teak, and bamboo are characteristic of this tangled forest, while the mulberry and tea shrub are cultivated. The elephant, tiger, and boar, tree-dwelling monkeys, apes, and brightly coloured birds and snakes are the most notable animals. (d) The evergreen forest of the Mediterranean coast.

(3) The *grasslands* or *steppe* have two resting seasons, during summer heat and winter cold, as compared with savanna, which has one season of drought. It occurs where soils are kept dry and loose by the constant winds, due to great diurnal and seasonal range of temperature. The steppe is very fertile where irrigated by water from the snow-capped mountains. (a) The Siberian steppe between latitudes 50° N. and 55° N., reaching as far east as the river Ob, consists of rich grass, with occasional trees, birch and brushwood. (b) The salt steppes of Turkestan from the Caspian Sea to the Aral Sea and Lake Balkash, also in Tarim and Takla Makan, are known as 'black sands' north of Aral, 'red sands' near the river Oxus, and 'white sands' from the Alexander Range to the river Chu. These names indicate the monotonous and desolate appearance of the country. This salt steppe passes into true desert. The saxaul shrub, which has no leaves, but only flowers and fruit, is grown to bind the sand. Its wood is extremely hard and heavy. Other plants like the wild olive and prickly species have pliant stems to resist wind,

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and hairs, thorns, and gum to resist evaporation. (c) High steppe. (i) The Mongolian region 3000 to 5000 feet high, which is less barren than the salt steppes, and more like the South African veld. But it becomes desert in the south-west. (ii) Tibet, where rainfall is moderate, but water quickly escapes to lower levels and into deep valleys. The north of Tibet is barren, desolate, and uninhabitable, consisting of poor steppe, leading to tundra just under the



FIG. 267. THE RACES OF ASIA

snowline. The animals of the steppe are the wild and domesticated horse, the two-humped camel, sheep, and goats, the yak in Tibet, antelopes on the Kirghiz steppes, gazelles in Persia and Mongolia, and even the tiger.

Caravan routes were the earliest links between the eastern and western world, and are still in use. From Peking (1) across the Gobi desert to Urga, the great trade centre of Mongolia, and thence to Kyakhta and Irkutsk for Siberia and Europe. (2) The route approximately followed by the great Marco Polo, and known as the jade route, which goes up the Hwang-ho to Lanchow, and then north-westward to Hami. Keeping to the north of the Tien Shan, it goes either through the Zungarian Gate to

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the Irtysh valley and Omsk, or from Hami to the Ili valley (flowing to Lake Balkash) and Kuldja, and connects with the railway at Tashkent. Another branch continues westward from Hami along the Tarim river to Kashgar.

The route between Asia Minor and Africa, through Syria and along the Palestine coast, is historically one of the world's famous highways. Similarly, routes to Mecca have great importance among Mohammedan races. Other routes but little used connect China with Lhasa, in Tibet, and with Burma; routes join also North-west India, through the passes of Afghanistan, to Russia and the Black Sea. It must be remembered, too, that not only the Siberian rivers, but the great rivers of China, India, Indo-China, and Mesopotamia are in many cases the most used highways.

Routes and Railways. (1) *The Trans-Siberian.* From Moscow, the line runs south-east to cross the Volga at the great Samara bend, the junction with the line to Tashkent. Striking north-eastward, the trans-Siberian route crosses the mining region on the broad uplands of the southern Urals to Chelyabinsk. Entering the rich steppe country, with a cultivation of wheat as well as pasture, it passes through the river port of Omsk. Proceeding, the river Ob is crossed at Novo Sibirsk (Nikolaevsk), the capital of Siberia proper, where the line is joined by a branch through rich steppe land from Semipalatinsk. Another short branch goes north to Tomsk. After crossing the Yenesei, gradients become a little steeper across the forested highlands, and numerous rivers have to be crossed to reach the shores of Lake Baikal. Trains used to be ferried across this fresh-water lake in summer and run across the ice in winter. But there is a line round the difficult country south of the lake. Proceeding eastward across the highlands, through Chita, the Yablonoi Mountains entail a climb to over 3000 feet, where day and night temperatures differ by as much as 50° F. Entering Manchuria at the crossing of the river Amur, the line ascends

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again to cross a gap in the Khingan Mountains, and so down to Harbin in the agricultural Manchurian plain. Harbin is the junction for the Russian port of Vladivostok to the east, and for Mukden to the south. From Mukden lines branch (a) to Korea, (b) to Newchwang and Port Arthur, (c) to Peking and southern China. There is also an all-Russian route, keeping to the north of the Amur boundary and reaching Vladivostok from the north. This route is much longer, and although the Little Khingan Mountains are crossed at a lower altitude, the winters are extremely severe.

The journey of nearly 6000 miles from Moscow to Vladivostok takes about ten days. The railway has been the means of attracting settlers to Siberia, and all the cultivated land and towns are within reach of it either by branches or by river-steamer. There is considerable trade between various sections in grain, animals, and animal products, especially butter, and there is a transcontinental trade in tea and silk from China, furs to Europe, and machinery and manufactures from Europe.

(2) *The Trans-Caspian.* From Moscow the railway runs southward to the Black Sea (Sea of Azov), along the foothills of the Caucasus to Baku, on the Caspian, where it joins the railway from Batum along the southern side of the Caucasus. Steamers ferry from Baku to Krasnovodsk, from which the railway follows the edge of the highlands to the oasis of Merv. Here a branch runs for 200 miles south to Kushk (near Herat), on the Afghanistan frontier, but the main line turns north and crosses the Oxus to Bokhara, Samarkand, and Tashkent. Beyond Samarkand a branch turns east to Andijan in the well-watered 'black earth,' cotton-growing district of the Fergana *via* Kokan. From Tashkent there is an important line crossing the Kirghiz steppe and connecting with the Siberian railway at Samara *via* Orenburg.

(3) *The Overland Route to India.* The British route to India lies through the Mediterranean and Suez Canal. A

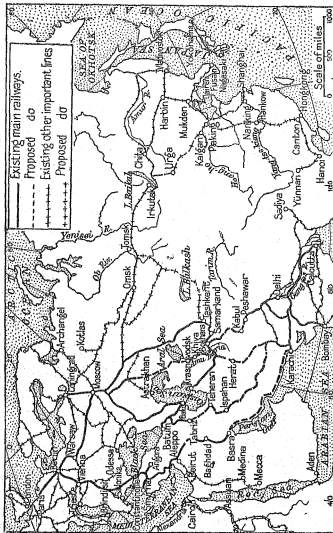


FIG. 268. ASIA: PRINCIPAL RAILWAYS

From "The New World: Problems in Political Geography," by Isaiah Bowman (The World Book Company, Yonkers-on-Hudson, and George G. Harney & Co., Ltd., London)

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thread laid on a globe to mark out a great-circle route parallel to the sea route from northern Italy to Bombay passes close to Belgrade, Constantinople, and Baghdad. This land route, therefore, was of great importance to continental countries like Germany and Austria. To meet this need the Baghdad railway was planned. It runs from a suburb of Constantinople across Asia Minor, through Konia, descends the Taurus through the Cilician Gates to Adana and Aleppo. After crossing the upper Euphrates it runs due east to the upper valley of the Tigris, and then down the valley through Mosul to Baghdad. But north of Mosul there is a section not yet completed. From Baghdad the line continues to Basra, and thus reaches the Persian Gulf. The direct land route lies along the Persian coast through Baluchistan to join the railway again at Karachi. This has already been much used as an air route, and is bound to grow in importance.

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Siberia. Reference has already been made to the relief, rivers, routes, and climate of Siberia. It remains to note how the chief towns focus the life and activities of their respective areas. In the west Omsk (162,000) is the chief centre. It stands in the best part of the steppe country on the Irtysh, which provides a means of communication north and south and by its tributaries to east and west. Omsk is also on the trans-Siberian railway. The Kirghiz bring to it wool, hides, and skins, the farmers their wheat and cattle and butter. Furs and fish are brought up the river, tea and provisions by the railway. Omsk compares closely in climate, position, and products with Winnipeg. The possibilities of the area in wheat-growing, dairy produce, and timber are even greater, but development depends on the character of the people. Near to it on the steppes are deposits of copper, and coal ready for the smelting of it.

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Tobolsk, lower down the valley, has similar advantages of river routes, but is off the railway, for vast swamps stretch away northward and eastward. It has a great trade in furs. To the west is Tiumen, another fur market, near a river confluence and on the railway between Omsk and Sverdlovsk (Ekaterinburg) in the Urals. Novo Sibirsk (121,000), the bridge town of the river Ob, receives the



FIG. 269. TRANSPORT ON THE STEPPES OF YAKUTSK

Photo E.N.A.

pastoral and mineral products of the Baraba steppe to the south. Tomsk (92,000) is another wheat market, with great waterways to north and west. It has a university, flour-mills, and distilleries, and is the centre for gold-mining and coal, but it lies fifty miles north of the railway. Barnaul (75,000), on the Semipatalinsk branch, is a growing centre of a very fertile area near the rich deposits of coal, gold, and silver of the Altai Mountains. Krasnoyarsk (72,000) is a steppe market, a keen rival to Tomsk, with a steamer service to Yeniseisk, a gold centre. In eastern Siberia Irkutsk (100,000) is the chief town. Well built on

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the banks of the Angara near Lake Baikal, and also on the railway, it is the focus of many forms of trade—furs, mining (coal, iron, gold, and silver), tea, and goods brought by caravan from China. Yakutsk to the north collects furs.

Chita is an important railway town at the head of the



FIG. 270. TRANSPORT IN RUSSIAN CENTRAL ASIA

Camel caravan laden with cotton passing through a tree-lined street of old Bokhara.

Photo E.N.A.

Amur navigation and the centre of the Transbaikalia mining area. The Amur is rich in fish, and salmon-canning is developing. Blagoveshchensk (61,000) is one of the Government gold-smelting laboratories, and mills the wheat from Manchuria. Vladivostok (100,000) is a modern city on a fine bay, and may be compared with Halifax, but it has a colder winter, and is not entirely ice-free. Timber is exported.

Russian Turkestan is a desert, with large oases, where

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the water from the mountains spends itself in the sand. The Caspian Sea covers 170,000 square miles, and has a maximum depth of 3000 feet. Its surface is 90 feet below sea-level. Like the Aral Sea and Lake Balkash, its waters are brackish, and seem to be decreasing. There is evidence here, and in the ruins of the lost cities of central Asia, of desiccation noticeable in Africa and Australia. Merv, Bokhara, Samarkand, Tashkent, and Khiva are all large cities with many villages clustering round them. They are the cities of romantic wealth, with high walls and gates, and narrow streets, all leading to the bazaar, where goods from far-off China and India (jewellery made from the gold and precious stones of the mountains), and products of the oases (fruit, rugs, embroideries, and beaten-brass goods), are all displayed in windowless shops, protected by awnings from the sun. Although the winters are severe, the hot summers and irrigation make possible the growing of many crops, including fruits of all kinds (grapes, figs, peaches, apricots, melons, mulberries, and pomegranates), rice and sesame (for its oil-seeds), maize, wheat, vegetables, and cotton. Dried and fresh fruit are the staple foods, for milk and meat are scarce. Cotton is the commercial crop, especially in Ferghana. The cotton goes to Russia for manufacture, seeds are crushed for oil which is used in cooking and for lamps, and the refuse of the cotton for camel food. But everywhere millions of silkworms feed on the mulberry-trees, and silk is important, especially in Bokhara and Ferghana.

The cities occupy the only possible routes across the desert and through the mountains. Marco Polo found them rich and prosperous in the thirteenth century; so have many marauding chiefs from the wide deserts, and their history is a chapter of sieges and destruction, each succeeded by the rise of a new city amid the ruins of the old.

CHAPTER XXXVI

THE FAR EAST

JAPAN

THE Empire of Japan extends along the coast of Asia for 3000 miles, from Sakhalin through the Kurile Islands to the Riu-kiu or Lu-chu Islands and Formosa in the south. The Kurile Islands were obtained from Russia in 1875, the Lu-chu in the next year, and the rich possession of Formosa, with a population of over 4,000,000, in 1895 from China; Karafuto, or the southern half of Sakhalin, in 1905. In addition there is Korea on the mainland of Asia.

The islands—Hokkaido or Yezo, Honshu or Hondo, Kyushu, and Shikoku, and other islands which form Japan proper—have an area exceeding that of the British Isles, and the whole Empire is more than twice the size of the British Isles. They lie nearer to the equator, between the latitude of London and North Africa, and, being on the east of a continent, have much greater range of temperature. They are not only longer and narrower but are much more mountainous. The mountains are three times as high as ours, and run through the centre of the islands. The whole range is volcanic; about fifty cones are active, and others, like the famous Fuji Yama, are dormant. Earthquakes are frequent, and sometimes devastating. Only about one-seventh of the island area is under cultivation, owing to the mountains and the cold climate in the north. Thus Japan has less arable land than Britain, and little pasture-land, over half of the area being forest. Yet the population of Japan proper is greater—viz., 65,000,000 (Britain 49,000,000)—and of necessity this large population is crowded round the coasts, especially in the warmer south.

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The islands are comparatively poor in minerals. The output of coal and iron is small compared with that of Britain. There is but little petroleum, and copper and zinc are the only ores that abound. The bulk of the population therefore is still agricultural, living in villages and on farms, the average size of which is only two and a half acres. Every possible area is cultivated with great skill and industry. Hillsides are terraced; supporting walls are

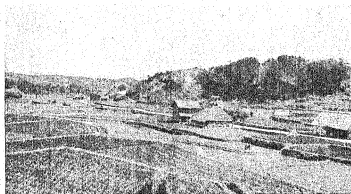


FIG. 271. JAPAN: RICE-FIELDS, SHOWING IRRIGATION

Photo Will F. Taylor

constructed to retain the earth which is carried there, regularly replenished and fertilized. Great attention is paid to proper rotation of crops, so that a succession of harvests is obtained during the year without impoverishing the soil. The peasantry are both thrifty and frugal, and supplement the profits of their farm produce by home industries. Only about one-fifth of the population are city-dwellers engaged in manufactures.

The irregular mountain system occupies the centre of the islands. Two chains roughly parallel may be distinguished, but the midland valley is most apparent where it has been drowned in the south-west, forming the beautiful

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inland sea. In other parts volcanic cones cross the valley in lines at right angles to the trend of the mountain ranges. The only plain of considerable extent lies behind Tokyo.

The limitations of the lowland, the separate islands, the enclosed seas rich with fish, have combined to make the Japanese great sailors. Their shipping is found in all parts of the world, their navy is one of the best, and sea-power has enabled them to extend their possessions not only to other islands, but to the mainland. As in Britain, the best natural harbours are found on the oceanic side of the islands. The Japanese are making a strong bid to become the carrying nation of the East, as Britain is the chief in the West.

The southern part of the east coast receives the warm waters of the Kuro Siwo, but north of Yokohama, where the trend of the islands is due north, the cold Kurile Current washes the eastern shore. In the region where the two currents meet off the north-east of Honshu and Yezo, fogs are frequent, and harbours are frozen in winter. Winds are south-east in summer and north-westerly in winter. The moderating effect of the winds from over the warm sea current is therefore confined to the summer months and to the south coasts, for the winter winds are from the cold continent. At the change of season dangerous typhoons occur. Latitude of course plays a great part, the Kuriles being very cold and Formosa tropical. The south-east naturally receives the heaviest rains. The wet season is from June to September, when over two-thirds of the annual amount falls. This heavy rain flows off the mountains as short, swift rivers, very subject to floods, which do great damage. They wash away rich soils instead of depositing them, and not only are the rivers useless for navigation, but they actually cut off communication in flood times, and silt up the harbours.

Communications by land are difficult to construct and to maintain. The railway through Honshu from Shimono-seki through Tokyo to the north keeps east of the moun-

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tains. Few railways cross the mountains to connect the opposite coasts, for the passes although fairly low are steep; the two most important are one from Tokyo and one from Nagoya. Fifty years ago there were only seventy-three miles of railway, to-day there are over 12,000 miles. Good roads are few, and wheeled vehicles are little used, most transport being by human portorage or by pack-horse. In this connexion it should be noted that there



FIG. 272. PLANTING RICE IN FLOODED FIELDS IN JAPAN

Photo James's Press Agency

are relatively few cattle and horses and far fewer sheep, for there is only a small amount of pasture, owing to the demands of agriculture, the heavy rains, and the unsuitability of native grasses.

But the abundant rain favours rice crops, which occupy much more than half the cultivated land. Although the demand exceeds the home supply, much Japanese rice, being of high quality, is exported, the deficiency being made good by imports of lower-grade rice. The quantities of both wheat and barley produced are less than the production in the British Isles. Rice is the staple food, and

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fish are eaten in great quantities, for very little meat, milk, butter, or cheese are available. Soya-beans are another food crop. Other crops are millet, potatoes, and tobacco. Tea is grown for export between latitudes 34° N. and 36° N. The mulberry is grown almost everywhere, with other crops between the rows of trees, as in Italy. Japan is the world's chief silk-producing country. Silk therefore heads the exports. The lacquer-tree is cultivated in the colder north, between latitudes 37° N. and 39° N., and camphor, obtained from a species of cinnamon-tree, in tropical Formosa. It will be noted that there is no home supply of wool and very little leather.

Woollen and cotton goods, yarn, chemicals, and dyes are imported from Britain, raw cotton, hides, and skins from the United States, and iron and steel manufactures from both countries. In return Japan exports raw and manufactured silk, beans and peas, straw-plait, and toys.

Coal is mined in Yezo, where the railway to Hakodate was provided specially for this trade; in the north-west of Kyushu, near Nagasaki; and in Formosa. Iron is obtained in the north-east and near Shimonoseki, but ore is also imported from China. The copper areas north of Tokyo and in Shikoku Island supply a surplus for export. China clay is abundant, which explains the well-known Japanese pottery. Paper plays a great part in Japanese life, and is made not only from the wood-pulp from the forests, but from rice-straw and seaweed. Match-making for eastern markets is one of the industries resulting from abundance of cheap labour (especially women), suitable wood, and sulphur from volcanic deposits.

After agriculture, fishing employs most people. The deep-sea fisheries for seal and whale are off Sakhalin and in the Bering Sea, for herring, cod, and mackerel off Yezo and the Kurile Islands; the native fish *bonitos* (similar to tunny), sardines, and lobsters are caught in home waters. Altogether fishing employs nearly 2,000,000 people, and supplies one of the main articles of diet for

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millions more. Fish are also exported, and fish-manure is manufactured from bones and waste. Weaving and dyeing of silk and cotton is the chief manufacture. Coal- and

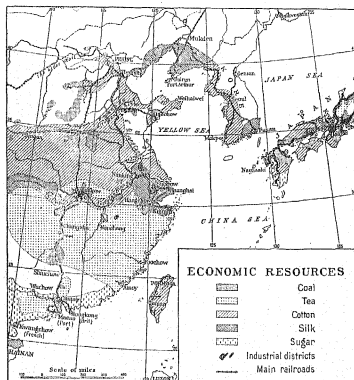


FIG. 273. THE FAR EAST: ECONOMIC RESOURCES

From "The New World: Problems in Political Geography," by Isaiah Bowman (The World Book Company, Yorkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

copper-mining, shipbuilding, and lumbering occupy most of the remainder of the industrial population. But a good deal of hand-weaving and the preparation of silk, tea, and rice for market is done in rural homes.

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Tokyo (2,000,000), the capital, occupies a central position in the islands. It stands on the banks of the river, draining the largest plain, but the mouth is silted up. Its important university played a great part in Westernizing Japan. Railways connect Tokyo both to Yokohama and to the petroleum port of Niigata on the west coast. Tokyo is the commercial headquarters of all Japanese industries. It is in many ways a modern city, but large numbers of houses are constructed of bamboo and paper products because of the earthquakes. Its varied industries include carved ivory and lacquer work, clothing, and match factories and chemical works. Yokohama (519,000) was completely destroyed in 1923 by a great earthquake, in which nearly 50,000 people lost their lives, but has rapidly risen anew to retain its place as the chief port of the country. Its position as the first port of call for trans-Pacific liners attracts to it also shipping from India and the west *via* Hong Kong. It has, therefore, a great *entrepôt* trade. It is the pivot of the railway system, and thus collects the bulk of the exports. Its silk export trade alone exceeds £20,000,000 in value.

Osaka (2,115,000) is the largest city. The harbour has silted up, so that Kobe is now its port. It is the textile centre of the country, with modern machinery and factories of all kinds, silk, cotton, sugar, steel, and ship-building works. Water-power from the great Lake Biwa, near Kyoto, is of great value to its industries. The twin cities Osaka and Kyoto (680,000) handle most of the trade with China and Korea, and they compete strongly with Yokohama for trade with Europe and the United States. Osaka is sometimes called the 'Venice of Japan,' because of the wonderful beauty of the archipelago in the inland sea facing it. Shimonoseki (92,000) is the railway terminus and packet station for Fusan, in Korea, one of the termini of the trans-Siberian railway.

Nagasaki (189,000), on the west of Kyushu, has the finest natural harbour in the islands, with a coalfield near

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the entrance to its landlocked bay. In this respect it compares with Hakodate, in Yezo. It is a great ship-building and repair *depôt*, and exports coal and fish. Its importance, however, has declined with the development of Japanese interests on the mainland, which have resulted in the rise of Moji and Tsuruga. Moji (95,000), the great coal port of Japan, opposite Shimonoseki, is 120 miles from Fusan; Tsuruga, on Wakasa Bay (latitude 36° N.), is only 490 miles from Vladivostok, and thus saves a day's journey on the overland route to Europe. Niigata (109,000), to the north, is also well placed in this respect, being 50 miles nearer, but suffers from heavy seas in winter.

Korea, or Chōsen. Although this peninsula is very mountainous and steep to the north-east, there are a number of very fertile valleys on the western side. It gets the heavy summer rains, and its rivers are more useful than those on the islands. The Japanese are developing its cultivation with characteristic thoroughness, paying particular attention to cattle pastures, which the islands lack. A drug called ginseng, much valued by the Chinese, is grown as a Government monopoly. But all the typical Japanese crops are also grown. Coal of good quality and gold are mined, and other ores await development. Rice, silk, beans, cattle and cattle products, and gold are exported to the islands, ginseng to China.

Seoul, the capital (315,000), is equipped with electric light and power. Its port is Chemulpho, on the Yellow Sea. Fusan (113,000), in the south-east, and Wensan (or Gensan), in the north-east, are growing ports, and all are connected by railway.

Formosa, or Tai-wan, is about twice the size of Wales. Its high temperatures and heavy rains favour abundant cultivation of rice, tea, sugar, jute, and tobacco. Its camphor and coal have already been mentioned. The west of this mountainous island is the best developed, and has a railway joining Taihoku (196,000) and Tainan, the largest towns, and their ports Keelung and Takao.

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Sakhalin is an island 650 miles long, about 100 miles wide, with a population of over 200,000. It has immense forests of larch and fir and deposits of coal and gold, but its chief value at present is its fisheries. The northern half is nominally Russian.

CHINA

This huge country, consisting of China proper and its outer territories, Manchuria, Mongolia, Tibet, and Sinkiang (or Turkestan), was originally an empire—an empire which contained a quarter of the human race. But in 1912 the Manchu Emperor was replaced by a President, and the country—larger than Europe—became a republic. Its unwieldy size and diversity of character—lowland plain, mountain, plateau, steppe, and desert—and the differences of race, language, religion, and occupations of its peoples have always made it difficult to control. The civil wars which have followed the change in government have added to these difficulties. The territories are virtually independent, but Japan has an influence over large areas amounting almost to complete control.

Manchuria is one such area. Lying between the Amur and the Yellow Sea, this lowland plain, shut in by mountains, is four times the area of Britain, with a population only half as large. Most of it is steppe country, with a fine, loamy soil, but the northern mountains are forested and fur-producing, and the eastern mountains are rich in minerals. The pastures are capable of yielding large quantities of meat and wool, of which, no less than the oil, coal, and iron of the mountains, Japan is in need. The cold, dry winters, a rather late summer, with about 20 inches of rain in the early part, but becoming hot and dry later, is very suitable for extensive wheat-growing. The railways have done much to attract settlers. Every year about 500,000 Chinese immigrants from Shantung and North China swell the population of the new towns built on modern lines. Already 82,000,000 acres are under

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cultivation. The money crop is soya beans. These have great food value, and can be used also for oil extraction, as fertilizers, and as cattle food. Most of the crop is exported, largely to Europe. Another food crop, of great importance for local consumption, is *kaoliang*, or sorghum, one of the millet species. Other grain crops are maize, wheat, barley, and rice, and these are widely grown, as well as crops of tobacco, indigo, and cotton. The rivers are valuable as highways: the Sungari for 700 miles, the Liao for 200 miles, and the Usuri for 300 miles, but all the rivers of China vary considerably in volume, and they are frozen between November and April. In these fertile valleys are many new towns with 100,000 inhabitants. Mukden (about 250,000), the capital, in the south, is a great railway junction with milling industries. Harbin, on the Sungari, is another commercial centre for wheat, beans, and flour. Newchwang (65,000) is a river port importing cottons, kerosene, and sugar, and Dairen, which is ice-free, has a trade next in importance to Shanghai. Most of the trade is with Korea, Japan, and Chinese ports. Both Dairen and Port Arthur are Japanese territory.

Mongolia, to the west of Manchuria, is mostly desert (Gobi) and dry steppe. The Mongols are nomadic, pasturing large herds of sheep and cattle, horses and camels, and trading in hides and wool. In the twelfth and thirteenth centuries these fierce people alternately plundered China on the east and ravaged Russia on the west.

These movements were probably caused by droughts, for the whole area is a great depression, with scanty and uncertain rainfall. Many ruins of sand-buried cities have been found. The Great Wall of China—one of the world's wonders—was built as a protection against invasion. It runs for nearly 2000 miles, from the Gulf of Liao-tung over steep mountain-sides and down into deep gorges. It is as wide as a road, and varies in height, reaching 30 feet in places, with towers at intervals. The Chinese have settled in Inner (southern) Mongolia, extending agriculture

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on the oases, where willows, poplars, and plum-trees line the tracks, and crops are grown.

The present population is about 750,000. Large numbers of camels are employed in caravan trade between China and Russia along the historic routes, winding for hundreds of miles through deep gullies and over mountain passes 10,000 feet high. Urga (100,000) is the focus of

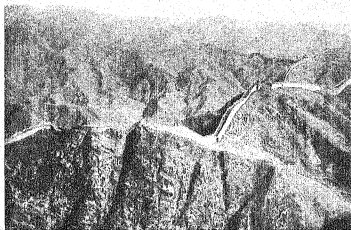


FIG. 274. THE GREAT WALL OF CHINA

Photo R.N.A.

these routes. It collects and distributes wool and hides from Mongolia, brick tea, silk, etc., from China, and furs from Russia. On the frontier to the north is Maimachin, a free town facing Kyakhita on the Russian side. The Gobi Desert is crossed by a road from Urga to Kalgan, in Northern China, the terminus of the Chinese railway. There is a motor-car service between these two towns during the summer months, but the journey takes three days.

Chinese Turkestan (Sin-kiang) consists of the Tarim

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basin, shut in between the Tien Shan and the Kuen-lun Mountains. Population, which numbers about 1,250,000, is mainly distributed in towns and villages and in reed huts along the river banks, but nomadic herdsmen graze camels on the thorny desert plants, and horses and sheep on the higher pastures in summer. The Lapliks fish in the lakes and swamps of Lob Nor. Routes follow the river and the line of oases along the base of the Tien Shan and Kuen-lun.

Kashgar is the meeting-place of Chinese, Hindus, Afghans, and Russians, to gossip and trade in the crowded bazaars. Their splendid carpets, silk goods, and carved jade ornaments and idols are much prized. It is a city similar to the cities of Russian Turkestan, with its walls and narrow, dirty streets, between mud-built, flat-roofed houses, crowded with camels, donkeys, and caravans. Irrigation canals from a tributary of the Tarim, fed by the snowy peaks which overlook the city, supply water to the orchards and gardens, and fruit, fresh and sun-dried, forms the chief food. Yarkand is another oasis town on the main river, similar to Kashgar.

Tibet. This great plateau in the heart of Asia is the highest inhabited region of the world. Nowhere much below three miles above sea-level, it is overlooked by ranges of mountains, which surround it and cross it, towering a mile or two above the surface of the plateau. In the east and south rivers form broad, flat, marshy valleys, which pass into deep, narrow gorges as they descend to the plains of China and India. Most of the country is like the tundra, with extreme daily and seasonal temperatures, and little moisture, and that mostly falling as snow. Northern Tibet is inhabited only in the summer, when wandering tribes bring their yaks to the pastures. The yak is as important as the camel in the desert or the reindeer on the tundra, providing milk to be made into butter, transport, fuel from its droppings, and skins for tents, domestic utensils, boats, and clothes. In southern

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Tibet, where the climate is milder, and some monsoon rains penetrate, life is more settled. The total population of Tibet is probably about 2,000,000. Villages built of stone or sun-dried bricks occupy strong positions in the valleys. The slopes are terraced, irrigated, and planted with barley, wheat, vegetables, and apricot- and peach-



FIG. 275. TIBETAN VILLAGE

Altitude 11,500 feet.

Photo E.N.A.

trees. Sheep, camels, and pigs are grazed as well as the yak, and small quantities of gold and silver are obtained from alluvial deposits. The peasants work this into ornaments, and make woollen articles, which are exchanged for the tea from China, butter (*ghi*), grain, and tobacco from Nepal, cotton goods, rice, and maize from India.

Lhasa, the capital (the 'Forbidden City'), stands in the valley of a tributary of the Tsangpo. Standing high on an eminence is the great red-roofed and golden-domed monastery of the Lama, who is the ruler of the country,

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and the 'pope' of the Buddhists. Pilgrims make long journeys to visit Lhasa, as the Mohammedans go to Mecca. The easiest route is from Darjeeling *via* the Chumbi valley, in northern Bengal. Other routes come from Simla in Punjab, and Leh in Kashmir, from Gartok on the upper Indus, and the Tsangpo valley, from China (Cheng-tu), Turkestan, and Mongolia.



FIG. 276. A TYPICAL CHINESE COUNTRY HOUSE

The Tibetans, like all mountain people, are suspicious of foreigners, and cherish their independence. In 1913 they declared their independence, but although neither China nor Britain interferes in internal matters the welfare of the country is watched much more by Britain than by China.

China. China proper has an area equal to thirteen times that of the British Isles, and contains a population of some 412,000,000, which is crowded chiefly in the river valleys and along the coast. It is a wonderful fact that this immense population has farmed its country from the

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days of Noah without exhausting the soil. Nowhere in the world over such a large area is land tilled with so much patience and thoroughness. Several, sometimes four, crops a year are obtained, and these include rice in the south, wheat and barley in the north, millet, beans, sweet potatoes, vegetables, and cotton. Periodically rice-fields are planted with mulberry orchards, and both crops benefit. Nearly everything is done by hand, planting, weeding, fertilizing, and even watering, although many quaint devices are in use for pumping. The Chinese are gardeners rather than farmers. Great attention is paid to manuring the land. Animals are few and are a sign of wealth—a buffalo, a donkey, a few black pigs or goats, sheep, in some parts, and a few poultry are the most one finds on the average farm. Meat is a luxury, to be tasted only at festivals like the New Year. Rice is the staple and favourite food, and one-eighth of cultivated land is devoted to rice. Near the rivers and irrigation canals ducks are kept, and fishing is practised by every conceivable device—line, net, and decoy. The tea-habit was acquired to flavour the boiled water when it was discovered that unboiled water resulted in disease. Edible birds'-nests, *bêche-de-mer*, and sharks' fins are regarded as dainties.

Everyday clothing, usually dyed indigo blue, is made of cotton, and padded with cotton for winter. Wool is too scarce and dear. Silk is worn by the rich, and by others only on holiday. Bamboo is used for everything possible. Houses are usually low, about three rooms round a mud courtyard, and the animals often share the room. Fuel is very scarce, and used with great economy. The sleeping-rooms have beds over brick flues, warmed by heat from the cooking fire. Charcoal braziers are the only other form of heat. One of the commonest peasant house industries is the spinning of silk.

The shortage of animals and good roads results in great use being made of rivers and canals for traffic by boats

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(junks). On land the wheelbarrow, by which amazing loads are carried, is the commonest vehicle, for its one wheel can better avoid the ruts than two. Carts can be used only in the broad valleys, but motor roads in parts are extending with amazing rapidity. Human portorage, by loads suspended from a yoke on the shoulder, is the most widely used. Donkeys over the passes, and camels on the desert routes, carry loads as packs.

As a race the Chinese have lived for 4000 years in close touch with nature and the land, living their lives almost indifferent to the form of Government. They work from dawn till dusk, living for the most part in what seems to us wretched conditions, yet they are sunny-natured, sociable, and capable of great endurance. There is no waste in China. The simplicity of their lives is shown by the coin known as 'the cash,' of which 5000-6000 are required to value £1.

Physically the country consists of lofty mountains in the west, opening to lowland plains in the east. The river Yang-tse divides the country almost equally. To the north lies the largest lowland; to the south is a highland region, with ranges running north-east-south-west, but not too high to be a barrier. But the three great river basins—the Hwang (Yellow), the Yang-tse (Blue), and the Si (West)—are so important in the north, centre, and south of China that it is best to consider the country in this way.

North China. After leaving the Tibetan plateau, the Hwang-ho cuts its way in deep ravines round the rectangular Ordos desert plateau and Shansi highlands, to receive the Wei-ho from the west. The Wei valley is an important route. Si-an, for many centuries the capital of China, is now the trade centre. Draw a line from about the source of the Wei to the north-east of China, another south of the Wei parallel to its course running eastward, and join the two eastern extremities by a third line curving parallel to the coast. This great triangle

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encloses the famous loess region. This yellow soil, blown from the deserts of Mongolia during the winter monsoons of countless centuries, has buried highlands and valleys to a depth of over a thousand feet in many places. Only the mountain tops stand up as rims to the loess basins. Rivers and roads cut themselves down deeply into this soft soil. Villages lie along the rivers and roads, but houses are built in the face of the cliff. Where rainfall is adequate, the soil is very fertile, but much of the Ordos tableland is too dry, and irrigation is impossible in most parts. The north-west limit of the loess marks also the usual limit of the monsoon rains, so that drought is the chief enemy to be feared. But by 'dry farming' great crops of millet, growing 10 feet high, are obtained. It gives a tremendous yield, and is of great food value. Matting is made from the millet leaves, and the stems are used for thatch and walls. Hats, baskets, and even sails for the junks are made of its straw. The river carries down heavy loads of this soil, which it deposits on its bed when speed slackens on the flat plains. Gradually, therefore, the bed and banks of the river have been built up above the level of the surrounding country, so that when the river is in summer flood there is always danger of burst banks. In the famous flood of 1887, when the Hwang-ho altered its course, as it has done several times before, a million Chinese perished. Towns, therefore, avoid its banks, and there is no port at its mouth. On the alluvial plains temperate cereals, wheat, barley, and fruits are grown. The Shansi highlands contain the largest known coalfield. The coal is of anthracite quality, lies horizontally, and is easily accessible. The field is linked by railway to Peking and the coast. Iron and limestone also abound. Coal occurs also in the mountains round Peking and in the Shantung peninsula.

Peking, no longer the capital since 1928 (1,298,000), stands with its walls four-square in the narrow, dusty plain commanding the route through Kalgan to Mongolia

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and the gate to Manchuria. These routes are followed by both roads and railways, which also link Peking to its



FIG. 277. A STREET IN PEKING

By courtesy of the London Missionary Society

port, Tientsin. This port, on the river Pei, is the chief port of North China, but suffers from ice in winter. It

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exports cotton and other fibres, animal products from Mongolia, and straw-plait. From Peking the Imperial Canal runs south to the rice-fields of the Yang-tse delta. Kiao-chow was formerly German and later Japanese, and Wei-hai-wei was British. Both are now returned to China.

Central China. The Yang-tse-kiang is navigable for 1600 miles, and many of its tributaries for hundreds of miles. It drains 750,000 square miles, and is the spinal cord of a region inhabited by 180,000,000 people. It descends from Tibet through the magnificent gorges of Yunnan, receiving many tributaries from the north. These tributaries, notably the Min, drain the 'red basin' of Sze-chwan, so called because of the red sandstone, which is rich in salt, as in Cheshire. These rivers flow over hard rock, and their water is available for irrigation. Cheng-tu commands a route to Lhasa *via* the Min valley. Here is practised that intensive agriculture mentioned above, crops varying with the altitude on terraces reaching up thousands of feet. From the Min confluence, the river rushes through gorges, with a series of rapids, to the port of Chung-king, and then down more rapids as far as Ichang, below which it is navigable for steamers for the remaining 1000 miles to the sea. Above Ichang, therefore, navigation is extremely arduous, the upward journey to Chung-king taking about a month, according to the state of the river, while the downward trip takes only a week. The native junks are towed upstream by teams of naked trackers, toiling along the face of the precipices at the risk of their own lives and of the crew. But small steamers have succeeded in making the journey in five days up and two days down.

Sze-chwan is therefore cut off from the rest of China. It is the richest province for silk, and sugar and tea too are very important. Cheng-tu is the chief town of this densely populated area. There are also rich fields of coal and copper not yet developed. Below Ichang, rivers, lakes, and canals approach from both sides of the basin, and

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decrease the danger of floods. The Han-kiang provides an important route from the north, with the great river port Hankow at its confluence. Hankow (800,000) is really a triple town, the other two parts being named Hanyang and Wuchang. Hankow is the great tea port of China. Railways run north to Peking and south to Canton. Modern manufactures of cloth and paper are growing in importance. Machinery and iron and steel goods are

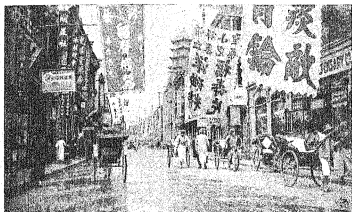


FIG. 278. A STREET IN SHANGHAI

made in Hanyang. Great imports of oil from the United States, Russia, and the East Indies, cotton goods, and European manufactures arrive there for distribution. Ocean steamers of 10,000 tons traverse the 600 miles from the sea to the port. Below Hankow the mile-wide river is crowded with craft plying between the numerous local ports, trading in tea, rice, and silk, and with houseboats moored to the bank. The province of Hu-nan, south of the main river, drained by the Yuen and Siang rivers, is another district rich in coal and iron. This area supplies the engineering and other factories of Hankow. Nanking (498,000), now once more the capital, is an important

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port for tea and silk, with railway connexions to Peking and Shanghai.

Shanghai (2,677,000) is the chief port of China. Although it is not on the river estuary its harbour, some miles up a tributary known as the Whangpoo river, silts up, and requires dredging. Larger vessels dock at the town of Wusung. The special feature of its commerce is the *entrepôt* trade for re-distribution to other ports. It is the great silk market of China, and has cotton and silk factories and shipbuilding yards. European countries have built fine modern buildings to house the business staffs which manage this great trade, but the native town is congested. Like Hankow, it exports tea, and imports various manufactured goods, timber, wheat, and even rice, to supply its dense population.

South China. This is cut by the Tropic of Cancer in the south. The mountain ranges trend from north-east to south-west at right angles to the wet monsoon winds, so that both temperature and rainfall favour forest growth. There is not much difference between the summer temperatures of Canton and Peking owing to the heavier cloud screen in the south, for the monsoon rains diminish northward. But in winter Canton has a temperature of 55° F., while Peking is below freezing-point. The forests supply good hard timbers, bamboo, spices, and camphor. Many clearings have been made for agriculture. Communication with the Yang-tse valley is confined to the river valleys, the most important of which is the Pei valley, followed by the railway. The broad lower valleys and coastal plains are great rice- and sugar-growing areas, with tea on the adjoining slopes. The mulberry, oil-seeds, and indigo are other outstanding crops.

The mountain province of Yunnan, in the west, with its high mountains, which run north-south, and deep valleys, is a difficult and little-known country, but undoubtedly rich in minerals, especially tin. A difficult route leads across the mountains to Bhamo, in the Irrawaddy

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valley. Yunnan is the chief province for the poppy, which is sent down to Wu-chow, at the head of navigation of the Si river.

Canton (812,000) stands on the most navigable distributary of the joint delta of the Si (west), the Pei (north), and the Tung (east) rivers, all of which are navigable. This command of three great routes and of the rich productive valleys accounts for the great importance of Canton in trade. Its manufactures include cotton, silk, and woollen goods, porcelain, and paper articles. Most of the traffic is carried in boats through the many waterways, but good roads encircle the city. It is estimated that no fewer than 300,000 people live in boats. Large vessels cannot enter, but use the British harbour of Victoria in the island of **Hong Kong**. This, with Kowloon on the mainland, is one of the best natural harbours, and it controls the *entrepôt* trade of South China, amounting to about £160,000,000, both of imports and exports. Sugar is sent from the mainland to be refined and re-imported as foreign sugar, to escape Chinese taxation. Shipbuilding and tobacco-making are other industries. Apart from its trade, it has great importance as a naval base and coaling station, as well as for cable and wireless communications. The Portuguese island of **Macao** is the centre of the opium trade. Opium is everywhere smoked in China, to minimize the pain of diseases contracted on the wet rice-fields. Farther east, along the coast, is the port of Amoy, with a good harbour. It is the outlet of the great Fu-kien tea district, and the port for Formosa, where coal is obtained at Keelung.

CHAPTER XXXVII

INDIA, INDO-CHINA, AND THE NEAR EAST

INDIA

INDIA, like China, is much more a continent than a country in size and population. Its area equals that of Europe, leaving out Russia, and its population of 350,000,000 constitutes about a sixth of the human race. Like the Chinese, its peoples are agricultural, but they have been less cut off from the rest of the world, so that they are more open to Western ideas. We must remember that although India is part of the British Empire rather more than one-third of it is under native rulers who have entered into treaties with the British Government.

Physical Features. The physical divisions of India are clearly defined—viz.: (*a*) the mountainous region of the Himalayas and the North-west; (*b*) the Indo-Gangetic plain; (*c*) the plateau and coastal plains; and (*d*) Ceylon.

These natural divisions show marked differences also in the peoples who inhabit them, as well as in climate and productions.

The mountain barrier consists of the Kirthar and Sulaiman Mountains on the west, the Hindu Kush and the Himalayas to the north, and the Patkai and Arakan Mountains on the east. Together they form a continuous wall. The Himalayas constitute an immense natural boundary, running from north-west to south-east, for a distance of 1500 miles, varying in width from 150 to 200 miles. They attain in the Great Himalayas a general height of 20,000 feet, and include the highest peaks in the world, such as Mount Everest (29,002 feet) and Kanchanjanga (28,146 feet). Such a height makes almost a complete climatic barrier. The summer monsoon is scarcely felt

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beyond it. And the tribes who live in the valleys of these high mountains are faced with much more difficult conditions than the people of the plains. Agriculture is restricted to alluvial flats in the valleys, and even then irrigation is necessary; but the snow-fed rivers provide

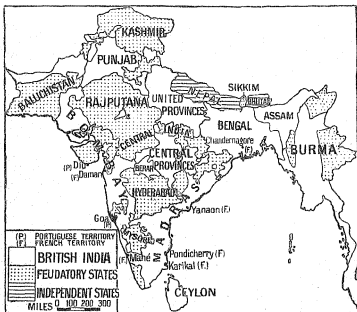


FIG. 279. INDIA: POLITICAL

plenty of water for this purpose. Cereals and fruits do well in these areas. For the most part, however, the pasturing of sheep and goats on the hillsides, cattle on the richer grass, and camels on the flat-topped hills is the chief occupation. Even the lesser ranges to the south maintain a general altitude of 6000 to 10,000 feet, and there are also a series of imposing foothills before the plain is reached. The southern slopes, especially to the south-east,

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present a range of climate and vegetation from tropical to Arctic. Behind the whole mountain barrier is the vast Tibetan plateau.

The *Indo-Gangetic plain*, 150 to 300 miles wide, lies parallel to the mountain ranges. The fertile alluvial soils deposited by the rivers Indus, Ganges, and Brahmaputra make this the richest region of India. The Indus and the Brahmaputra rise at no great distance from each other on the northern side of the Himalayas, but flow in opposite directions along longitudinal valleys for 1500 to 1800 miles before descending to the plain. The Ganges and the Sutlej rise on the southern side, and together collect the other streams which drain the southern slopes. Their waters supply extensive irrigation schemes in the drier parts. The Ganges was formerly the only great highway through this flat and populous region, but the railways are now the chief means of transport.

The plateau or *Deccan* has for its western edge the Western Ghats, high and unbroken by any streams south of the river Tapti. In the south they rise to form the Nilgiri Hills (8000 feet). Between them and the Cardamom Hills is the Palghat Gap, which provides a route from Madras to Calicut. The rivers of the Deccan—Mahanadi, Godavari, Kistna, and Cauvery—flow eastward through deeply cut gorges in their upper courses, and descend through the defiles of the more broken Eastern Ghats and form large deltas. The narrow south-west coast is therefore shut in by mountains, and retains its primitive character. The broader south-east coast is open and progressive. To the north-west the drainage has been much altered by flows of lava in ancient geological times. The chief westward-flowing rivers are the Narbada and Tapti, the valleys of which are flanked by the Vindhya Mountains to the north and the Satpura and Mahadeo ranges to the south and east. Note the Khandwa Gap, which provides a convenient route from the west coast to the Ganges valley. Stretching away to the north-west,

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the plateau culminates in the Aravalli Hills, which overlook the desert of the Thar.

Ceylon, separated from the mainland by Palk Strait and the Gulf of Manar, too shallow to be navigated, is an outlying portion of the plateau of Southern India. The northern half is lowland, but to the south rises a much-dissected limestone plateau. The highest points are Pedro-tallagalla (8320 feet) and Adam's Peak (7352 feet).

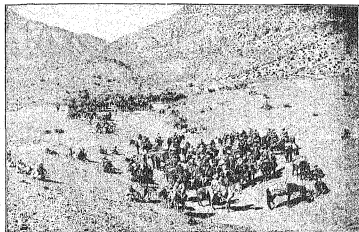


FIG. 280. THE KHYBER PASS

The Pathans of the North-west Frontier are fierce peoples, ready to attack each other and their more prosperous neighbours when times are hard. The ever-present danger of this unrest lends particular importance to the passes which lead to the Indus plains:

- (1) The Khyber Pass. All the early conquerors have come this way. It is a grim, rocky defile, lying between Kabul, the capital of Afghanistan, and Peshawar, the British frontier town. The river Kabul does not flow through the pass, but to the

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north of it. The pass is a deserted river gorge, and a railway now runs through it from Peshawar to the Afghan frontier.

- (2) The Bolan Pass, followed by the railway from the Indus valley to Quetta.
- (3) The Gomal Pass, from the Punjab to Ghazni, between the Khyber and Bolan Passes, is a difficult pass, defended by the fierce Waziris.

Kalat is the hub from which all the mountain routes of Baluchistan radiate. Quetta stands on a plain among the hills and commands the Bolan Pass. Kandahar, an oasis fed by the waters of the river Helmand, commands routes between Afghanistan, Persia, and Baluchistan, as well as from Russian Turkestan *via* Merv and Herat.

- (4) The Dorah Pass gives a lofty route in the Hindu Kush from the Punjab, *via* the Gilgit valley and Chitral, to the Oxus plain of Central Asia.
- (5) The Karakoram Pass, over three miles high, provides a route from Kashmir into Chinese Turkestan.

The next pass to the east leads from Darjeeling to Tibet by the Chumba valley route, about a thousand miles farther east.

The southern slopes of the Himalayas condense the moisture-laden air of the summer monsoon, producing great glaciers in the higher valleys and dense forests, which in some parts extend as far up the mountains as two miles. Along the base of the central Himalayas is the marshy *terai*, covered in the east with dense jungle—the home of the tiger and many other wild animals and venomous snakes. Farther to the north-west, in the forested foothills, are hill stations like Simla. Here the height affords relief from the high summer temperature of the plains, and here the Viceroy and chief Government officials resort in summer. Farther east, on the route to

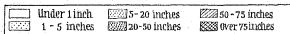
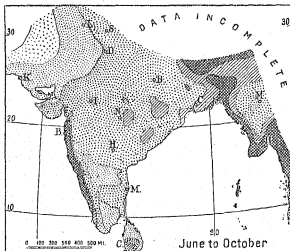
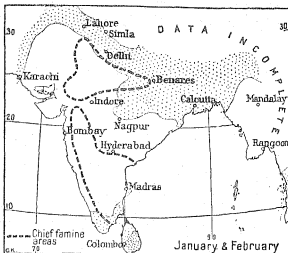


FIG. 281. RAINFALL AND FAMINE AREAS OF INDIA
 From "The New World" (World Book Co. and George G. Harrap & Co., Ltd.)

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Lhasa, through Sikkim, is Darjeeling, a health station for British troops. In thirty-five miles the railway from the plains climbs one and a half miles through tea plantations on the lower slopes and magnificent forests above them, along the sides of precipices, round great curves, and

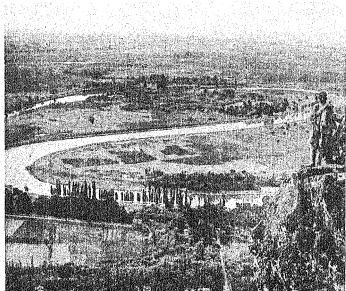


FIG. 282. VIEW OF KASHMIR AND THE RIVER JHELUM

Photo Will F. Taylor

through many tunnels. Kanchanjanga (28,146 feet) stands majestically fifty miles off, and Everest (29,002 feet) can just be seen a hundred miles away. The summer rainfall here is very heavy, but the wettest place in the world is at Cherrapunji, in the Khasi hills of Assam, where it amounts to over forty *feet* in the year.

Kashmir lies between the Karakoram range and the Himalayas. It is a native state of great grandeur. The

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Indus waters this fertile valley before turning south to plunge through forested gorges to the plains below. The town of Leh commands the routes over the Karakoram range to Yarkand, in Chinese Turkestan. It is a great caravan centre for summer trade in wool from Tibet, carpets, silk, tea, and fruits from Turkestan, and rice and sugar from India. The chief town of Kashmir is Srinagar (142,000). Though it is over a mile above sea-level it stands in the Jhelum valley, amid rose gardens and pros-



FIG. 283. PUNJAB: NEW RAILWAY BRIDGE ACROSS THE INDUS
Photo E.N.A.

perous cultivations of cereals and fruits on the alluvial deposits of an old lake. Goats pastured on the mountains provide soft, silky hair. Its people are famous for the beauty of their handicrafts, shawl-making, metal-work in silver and copper, and lacquer work.

The Indus Basin. The Indus-Ganges plain varies from 150 to 300 miles in width. The Indus is a snow-fed river, and tends to dry up in the hot season, but the Ganges is at flood from June to October. The Punjab is the land of the five rivers—Indus, Jhelum, Chenab, Ravi, and Sutlej. They have spread out alluvial soil, and irrigation works now conserve the water-supply when the rivers are low, so that the country has become prosperous, growing winter wheat for export through Karachi. In summer the Sikhs, a race of fine physique and high intelligence, grow rice, millet, and cotton, practically all, including the cotton,

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being used for home consumption. There are now several hundred cotton-mills in India, and some of the processes are carried on in the homes of the peasants. On the hill-slopes and poorer lands large numbers of sheep are kept to supply wool for carpets and cloth.



FIG. 284. A STREET IN THE BAZAAR OF A TOWN IN NORTH INDIA

By courtesy of the London Missionary Society

The large towns stand on the upper courses of the rivers. Lahore (282,000), the capital, is a great railway centre, with many manufactures. Amritsar (160,000), the old Sikh capital and religious centre, stands on the plain between the Ravi and the Sutlej, and manufactures silk and wool. Multan has a central position in the lower course of the united rivers, and is the focus of the Punjab railways, which bring wheat for despatch to Karachi.

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In the north-west, near the confluence of the Kabul-Indus rivers, stands Peshawar, the great frontier fortress which guards the farmers of Punjab from Pathan raids. On its way to the sea, past the great Thar Desert, the volume of the Indus shrinks. At Sukkar is the great new

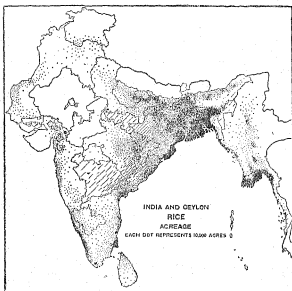


FIG. 285. DISTRIBUTION OF RICE CROPS

From *"The New World: Problems in Political Geography,"* by Evelyn Dawman (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

Lloyd barrage destined to irrigate millions of acres of waterless Sind. Below Hyderabad it forms a great delta. Karachi (217,000) ranks third to Calcutta and Bombay as a port, and stands at the northern edge of the delta. It is the nearest Indian port to Britain. As the junction of ocean, air, and railway routes (see overland route, page 620) its importance is great. It is the second port in India for cotton and wheat.

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The Ganges Basin. The Ganges basin is, however, the most densely populated part, because it receives its rains in the summer heat. Most of India has three seasons—hot, rainy, and cool—but the south is seldom cool. March to May is hot, especially in the Deccan. The monsoon

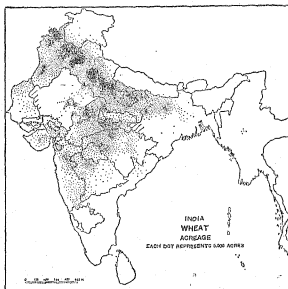


FIG. 286. DISTRIBUTION OF WHEAT CROPS

From "The New World: Problems in Political Geography," by Isaiah Bowman (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

'bursts' on the Western Ghats at the end of May or early June, and the rainy season lasts till October, November to February being cool. The Ganges valley is the home of 100,000,000 people. The monsoon winds, unable to get over the mountain-wall, are deflected up the valley as easterly winds. The lower valley is very wet, and this is the chief rice region, two crops being obtained in the year. The other staple foods are millet and pulses, and

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garden produce is grown almost everywhere. Sugar-cane, indigo, and tobacco are also important. As in China, oil-seeds, like castor oil, linseed, and sesame, figure widely in the scheme of annual crops. Opium is chiefly grown in the middle valley, jute in the Ganges-Brahmaputra valley, and tea in Assam, along the banks of the Brahmaputra and on the Khasi Hills.

Here then are the teeming millions of people, magnificent temples and palaces, great wealth and sublime beauty, side by side with drab dwellings and great poverty. But it is not dismal, for bright colours abound everywhere, especially in the bazaars spread with wares and fabrics of every kind—silks and shawls, carpets, gold braids and embroideries, carved works of art in brass and copper, wood and ivory, precious stones and pottery. But India is no longer confined to agriculture and handicraft, for factories are found in most of the large cities—*e.g.*, cotton-mills are established at Agra, Cawnpore, Delhi, and Nagpur; flour-mills, wool and leather manufactures at Cawnpore, Lucknow, and Allahabad; silk and jute factories at Calcutta. Formerly communication between these great cities was chiefly by river, for roads were difficult to make and maintain in this alluvial plain. But railways have now been built for trade, for sending quick help to famine areas, and for strategic reasons. Calcutta (1,132,000), formerly the capital, is the chief port for the Ganges basin and for India as a whole. The British settlement on the Hooghli river dates back to 1690, since when it grew to be, until recently, the second largest city of the Empire. It had the advantage over Bombay and Madras of river transport for the raw materials. Since the development of railways it also has the advantage of being within two hundred miles of India's greatest coalfield to the north-west, from which 85 per cent. of the total output comes to supply power for jute-mills, for shipping, and for export. Although its harbour is made somewhat dangerous by strong currents, it clears nearly 10,000,000

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tons of shipping a year. Its climate is hot and damp, but modern sanitation has lessened disease and epidemics. It is a city of palatial buildings, with a university and several Government colleges. From its wharves over a third of the total overseas trade of India is sent. Jute and tea are the chief of its many agricultural exports.

A journey from Calcutta would take us through the villages of the rice- and cotton-fields, through plantations of sugar-cane, millet, and poppies to Patna, the opium and rice market; to Benares, the Hindu sacred city, thronged with pilgrims eager to descend the great ghats or steps to bathe in the holy river—a city famous also for its bazaars and its brasswork; to Allahabad, at the Ganges-Jumna confluence, from earliest times a great centre of routes, but now emphasized as such by its railway junction with the Bombay railway; to Cawnpore, with its memories of the Mutiny and its modern factories; to Agra, famous for the Taj Mahal tomb of the Mogul Emperor's wife—important now for its great wheat market, for its cotton-mills, and as a railway junction for Bombay; and to Delhi, the capital.

Delhi (304,000) stands at the narrowing of the plain on the low divide, between the Indus and Ganges. The desert to the south and the mountains to the north focus all traffic upon it. Modern Delhi stands near the ruins of many former cities laid waste by conquerors. It has the great advantage of being central. A circle of 800 miles radius described about it passes near Karachi, Bombay, and Calcutta, while Peshawar lies well inside it. The growing importance of the air route *via* Karachi adds to this advantage. It is near the Viceroy's summer palace at Simla. To the Hindu mind it represents government and the mighty past, not of a province as in the case of Calcutta (Bengal) or Lahore (Punjab), but of India as a whole. Its site is drier and healthier than that of Calcutta.

Peninsular India—the Deccan. The plateau descends to the coastal plain in terraces, less marked but similar to

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the *karoos*. Hence the name *ghats*. The escarpment of the Ghats which borders this plateau is high and steep on the west, but ill-marked and low on the east, where the coastal plain is wider. This forested escarpment proved a barrier to approach from the Arabian Sea, as the heavy surf and lack of harbour did along the east coast. The Western Ghats naturally receive very heavy rain, but, as

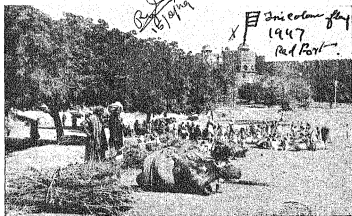


FIG. 287. NATIVES AND OXEN RESTING OUTSIDE DELHI

By courtesy of E. A. Arnold

the rivers indicate, the general slope of the plateau is eastward, so that rainfall on the plateau soon diminishes and is uncertain. A poor monsoon spells famine for large areas. The only large rivers flowing westward are the Narbada and Tapti, and their courses are due to the uplift of an area of volcanic rock. This rock has weathered into a rich black soil. The centre from which the rivers diverge is in the north-east, near the Kaimur Hills, which are an extension of the Vindhya Range. To the north the Chambal and the Sind join the Jumna; the Son flows north-eastward to the main river at Patna, and the Damodar eastward to the Hooghli. The Mahanadi, Godavari,

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Kistna, and Cauvery all rise near the Western Ghats and flow to the Bay of Bengal. They all have cut rather deep, narrow valleys, and have built deltas on the coastal plain, so that, as in South Africa and Spain, they are useless for navigation, and make communication north and south difficult.

The Western Ghats are heavily forested, teak and sal being abundant. Rice is grown on the plain. Much of

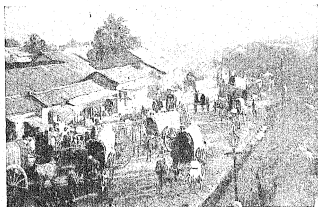


FIG. 288. A VILLAGE MARKET IN INDIA

By courtesy of the London Missionary Society

the Deccan is covered with red porous soil of decomposed volcanic rock called laterite. This, combined with uncertain rainfall, makes most of it suitable only for grassland, on which cattle and sheep graze. Milk forms an important article of diet, and cows are kept wherever possible, but little meat is eaten, mainly on religious grounds. India has 120,000,000 oxen, besides thirty to forty millions each of buffaloes, sheep, and goats. Horned cattle for farm labour are reared in the country between the Aravalli Hills and the Thar Desert. For cultivation, thousands of tanks and dams are constructed along the

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rivers to store the rain, which sometimes falls very heavily for a few hours only. The general crops are millet, pulses, and oil-seeds, but tea, and some coffee, is grown in the Nilgiri Hills, in the south, wheat in the north-west, and

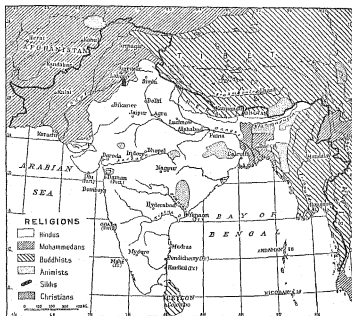


FIG. 289. THE RELIGIONS OF INDIA

From *"The New World: Problems in Political Geography,"* by Isaiah Bowman (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

cotton in the area behind Bombay. The two latter crops are grown on 'black earth' soils, which hold the water much better than the laterite. Raw cotton heads the list of exports, and cotton goods the imports. But this export is only one-third of the crop, the remainder being manufactured in India. India follows the United States and Egypt as great cotton areas, but the Indian

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fibre is much shorter, coarser, and more brittle than the American, and Indian factories are specially adapted to use it; the quality, however, is improving. Sugar-cane and spices (pepper and cardamoms) are grown in the south, and coconut-palms abound on the south coasts. The eastern plain grows rice, millet, tobacco, and indigo.

The most important coalfields occur on the north-east of the Deccan, notably that at Raniganj. Coal is also mined in the Narbada valley and along the river Godavari; manganese at Nellore, near Madras, and in Rajputana; gold in Mysore; and iron ore occurs in many parts. Along the Western Ghats large reservoirs have been constructed near the headwaters of the rivers to provide electric power.

The courses of the Narbada and Tapti provide important routes from the Gulf of Cambay to the east. Surat commands the Gulf, and was the first British trading fort. Following the Tapti to Burhanpur, a route cuts through a gap in the Satpura Mountains to Khandwa, and so by the Narbada valley to Allahabad. Another route passes northward through Baroda and round the northern side of the Aravalli Hills to Delhi.

There are no natural routes from Bombay. A road was first constructed, and then a railway, by zig-zags over the Ghats, to run northward to join the Tapti route, eastward to Nagpur and the Raniganj coalfield to Calcutta, and southward through Poona, which commands all the Deccan routes to Madras. From Calicut, in the south, a railway climbs through the Palghat Gap (1000 feet), between the Nilgiri and Anaimalai Hills (8000 feet), to Madras. Gauges differ, but there are through routes on the standard gauge.

Bombay (1,176,000), built on an island twenty-two square miles in area, has the best harbour in the country, and is the second city and port of India. But it owes its importance to the Suez Canal and to the railway. Its university was founded in the year of the Mutiny. It has

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a monopoly of the cotton trade, both for export and manufacture. The factories use electric power generated

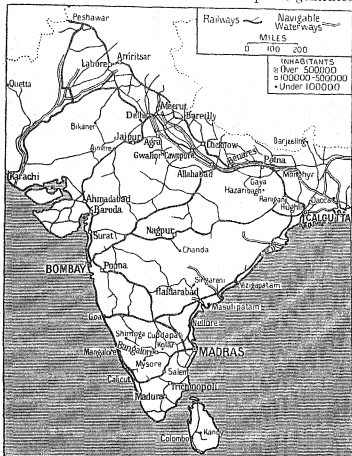


FIG. 290. INDIA: CHIEF RAILWAYS AND NAVIGABLE WATERWAYS

in the Ghats. Coal comes from the Deccan for shipping and railways. The other exports are oil-seeds, wheat, and

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timber. There are also leather and silk factories, mostly managed by Parsees, not Europeans, as at Calcutta.

Modern Madras (527,000), like Calcutta and Bombay, is a city of British creation. Most of the trade in the produce of the plain goes through to Bombay, because Madras suffers from a poor harbour and heavy surf; but tea, tobacco, teak, and hides are exported. Of the cities on the Deccan, Hyderabad, the capital of the largest state, ranks as the fourth city of India. It occupies a good defensive position on an enclosed plain not far from the diamond-mines of Golconda. The Nizam is one of the most powerful native princes. Bangalore, in Mysore, has attracted many Europeans on account of its healthy climate, due to height. It is a great railway centre. Poona similarly has a high altitude (10,000 feet), was once the Mahratta capital, and is now the Simla for the Government officials from Bombay.

CEYLON

Ceylon is an island bountifully endowed by Nature. Its gorgeous scenery, palm-fringed shores, smiling valleys, forested hills, and ancient towns retain the beauty of the East, although its position on the ocean highway between Europe and the Far East has brought it in contact with Western civilizations—first Portuguese, then Dutch, and finally British 150 years ago.

It is not as large as Ireland, and has a central plateau of about 6000 to 8000 feet, drained by swift-flowing rivers. Lying near the equator, both winter and summer monsoons reach it across a tropical sea, so that it gets rain at both seasons, and tropical thunderstorms besides. The coastal plains of the north are hot, with an average temperature of 80° F. But the hills enjoy a pleasant temperature of about 65° F. The natural forests have been extensively cleared for plantations of tea on the south and west. After two years of plucking at eight to ten day

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CEYLON

intervals, the bush is pruned down to three feet or less, to burst forth into new vigour. There are nearly 500,000 acres planted with tea-bushes. Rubber plantations cover a slightly larger area. Tapping commences in the sixth year, and the latex is collected by coolies from a cup fixed on the bark at the lower end of a half-spiral incision. Coconut plantations cover nearly twice the area devoted

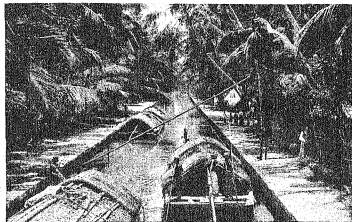


FIG. 291. THE NEGOMBO CANAL, CEYLON

to tea, although the palm is not indigenous to Ceylon. These plantations are on the west and south. Besides the value of fresh nuts, copra worth £2,000,000, coconut oil worth £1,250,000, desiccated coconut worth nearly £1,000,000, as well as valuable fibre and other products are obtained. The terraced 'paddy' or rice-fields are one of the beauties of the island, and nearly 1,000,000 acres are devoted to it. Ceylon is one of the chief sources of supply of cinnamon. The bushes are kept six to eight feet high, and the cinnamon is obtained by peeling the bark and rolling it. In addition cacao, cardamoms, pepper, nutmegs, cloves, vanilla, and tobacco are grown.

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Cardamoms are the most valuable of Indian spices, although little known in Europe. As to fibres, besides coir from the coconut, kapok and cotton, sisal and hemp are grown. Pineapples, bananas, and other fruits are also widely cultivated.

Ceylon has always been famous for its pearls and precious stones—the ruby, amethyst, sapphire, topaz, and many others—found chiefly either in beds of old rivers or in existing rivers. The production of plumbago or graphite is the oldest industry. It is obtained from the veins of crystalline rocks. Salt is obtained by evaporation of sea-water in shallow lagoons.

Sea-fishing is carried on all round the coast, and catches include a kind of mackerel, *bonitos* or tunny, but the chief areas are on the Wadge Bank near Cape Comorin and the Pedro Bank to the north of the island. The pearl-oyster fisheries are off the north-west coast, but periodically the banks become barren for a number of years.

Kandy, a little town on the hills, where the climate is ideal, was the old capital, but Colombo (244,000), on the west coast, is the present capital and chief port, with a good artificial harbour. Now that so many of the countries round the Indian Ocean are under British control, Colombo is the natural centre for routes to Durban and Cape Town, Aden and Suez, Bombay, Calcutta, Singapore, and the Far East, and to Fremantle in Australia. Consequently it is an important coaling station, and has a great *entrepôt* trade. Passengers change steamers there. Its attraction, too, for tourists has prompted the slogan that as "Wise men came from the East, wise men are returning to it." To meet the needs of its varied population rice, coal, cotton goods, sugar, and fertilizers are imported.

BURMA

Burma is at present a province of India, but before British rule was established there a century ago Burma

BURMA

had little to do with India. Since then it has been administered from India, but is almost certain to be given separate government again shortly. The parallel ranges of mountains, Patkoi and other ranges, which separate it from the Brahmaputra plain, act as a barrier between Burma and India. Burma is three times the size of Great Britain, and has a population of over 13,000,000. The Burmans are akin to the Chinese and Siamese, and are Buddhists. From earliest times the monks have taught reading and writing, and, thanks to this education, Burmese women are given a higher status than among any other Asiatic people. Also there is no caste system. Fond of colour, like the Indian peoples, their monasteries and pagodas and their picturesque dress indicate art of a high order. The banks of the rivers are the most populated parts, for all kinds of vessels, from double-decked steamers to native dug-outs, ply to and fro.

They are an agricultural, not a commercial, people, cheerful and tolerant. From the swampy deltas and wet lower valleys the world's greatest export of rice is obtained, whole families taking a part in its cultivation. Cotton is a crop of increasing value, and plantations of sugar, tobacco, oranges, and pineapples are being developed. Although the upper valleys are drier, the mountains receive heavy rain, and are clad with valuable forests of teak and other timbers suitable for house-building and furniture. Teak logs are left to dry for three years, then dragged by elephants or buffaloes to the rivers, and floated down in rafts to Mandalay, Rangoon, or Moulmein. Big game, including wild elephants, tigers, and leopards, abounds in the more remote forest areas. Rubber is grown successfully.

Burma is also very rich in minerals. The silver-lead mine in the northern Shan States, once worked by the Chinese, is one of the largest of its kind, and still maintains a valuable output. Tin and wolfram are worked in the south, near the Malay States, others await development.

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From Upper Burma, too, much petroleum is obtained, and there are deposits also in the lower province. Its precious stones, rubies, sapphires, and jade are famous. Mandalay, the former native capital, is the route centre of Upper Burma. Railways run to the tin-mines and oil-springs in the north, and to Rangoon and the Yunnan boundary of China. Rangoon (342,000) is the chief port and commercial capital. It is the fourth port of our Indian possessions. The river is navigable for 900 miles above it. It has two cathedrals, fine temples and Government buildings, and one of the finest parks in the East. There are eleven important markets. It stands on the east of the delta, with railways to the interior, and has oil-refineries, rice-mills, and saw-mills. There is also a flourishing industry in carved wood and ivory. Moulmein is a timber port, and Bhamo, at the head of the Irrawaddy navigation, is the starting-point for track routes to Yunnan.

THE ANDAMAN AND NICOBAR ISLANDS

About 120 miles off the coast of Burma are the Andaman Islands, a group of five large and many small islands, richly wooded with valuable trees, notably redwood, coconut, and rubber. They have been used as a penal settlement for Indian convicts, who cultivate hemp and graze cattle and sheep, but the islands will develop in future on different lines. There are many excellent ports and a wireless station. Port Blair is the chief town and port.

The Nicobar Islands are about seventy to eighty miles to the south. They are quite small, and only nine are inhabited. For over 1000 years the islanders have traded in the coconut and its products, which are exported in native craft and Chinese junks.

The Laccadive group, 200 miles off the west coast of India, are administered from Madras. The Maldives, 400 miles south-west of Ceylon, have a sultan, who pays tribute to the Ceylon Court. The Maldives are a group of

SIAM—STRAITS SETTLEMENTS

coral atolls, and both groups grow coconuts, millet, fruit, and nuts.

SIAM

Though rather smaller than Burma, Siam, with a population of over 10,000,000, is a similar country, lying between Burma and French Indo-China. The north is mountainous and forested, but the southern valley of the Menam is a flat rice-growing plain. The narrow isthmus of Kra is a low pass dividing the two mountainous parts of the southern peninsula. Rice, tin, and teak are exported, and cotton, sugar, tobacco, and hemp are grown for home needs. Bangkok, the capital and port, stands on the Menam at the head of navigation for ocean-going steamers. Railways extend for 500 miles to Chiengmai, on the edge of the jungle, a northern centre for routes to Burma and China, and southward through Penang to Singapore.



FIG. 292. MALAY STATES AND EAST INDIES: TIN-MINING

THE STRAITS SETTLEMENTS AND FEDERATED MALAY STATES

Tin competes with rubber for priority of place in the productions of the country. It supplies half the world's output of tin, worked by Chinese coolies, and more than half the supply of rubber. Tin occurs in the mountains

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and in alluvial deposits along the western plain. The alluvium is water-washed, the lighter tin settling out at the upper end of the puddling vats. The tin deposits on the eastern coast are not yet fully worked. The cultivation of the coconut-palm, spices, fruits, and a species of cinchona, from which is obtained a rich tanning product called gambier, are also important. Penang handles a third of the exports, the remainder going through Singapore. The country has a high uniform temperature, about 80° F., and over 100 inches of rain a year. Singapore is on an island of 217 square miles at the end of the peninsula, separated by a strait three-quarters of a mile wide, but bridged by a railway to Johore on the mainland. Its importance on the great world routes has been mentioned. It is the collecting and distributing centre of the whole region, an important wireless station, cable junction, and coaling station. In view of its strategic value to the Empire it is fortified, and to meet the needs of the Navy in eastern waters, a floating dock capable of taking the largest battleship has been moored in its harbour.

FRENCH INDO-CHINA

This territory has about the same area as Burma, with a population of 21,000,000. A mountain chain 4000 to 9000 feet high curves throughout its length, separating the plain of the lower Song-koi (Red river), in the north-east province of Tongking, from the great plain of the lower Mekong of Cambodia, in the south. Cochin-China, on the east, is a French colony. The other states are ruled by native rulers under French protection. In climate and products its characteristics are those of the rest of the peninsula. Tongking, in the north, is the chief mining area. Coal, zinc, phosphates, and wolfram are obtained. Haifong is the mineral port. A railway runs from the port of Tourane (south of Hue) along the coast to Hanoi (496 miles), a fine modern town, with a population of

THE NEAR EAST

103,000. It is the capital of Indo-China. Another line connects the port of Haifong to Yunnan, in China, *via* Hanoi and the Song-koi valley (534 miles).

Saigon (130,000), to the east of the Mekong delta, in Cochín-China, exports the bulk of the rice, which constitutes three-quarters of the total exports of the country. Most of the exports are sent to Hong Kong. From Saigon a railway follows the coast to the north to Nha-trang, a distance of 263 miles. Sea-going steamers can reach Pnom Penh, the chief town of Cambodia, an important centre for cattle and of native industries.

IRANIA

The plateaux and river basins of the countries lying between the Black, Caspian, Mediterranean, Red, and Arabian Seas occupy a central position in the land mass of the Old World. But this large area, about the size of Europe, contains so much highland and desert that the total population is only equal to that of the British Isles.

Afghanistan is a buffer state between Russia and India. We have seen how important are the routes to India. Cultivation is limited to wheat, barley, and rice in the alluvial river bottoms, and stone fruits, grapes, and figs in favoured spots. The sheep which graze the mountain pastures, like those of the steppes, store fat in their tails, and this is a valuable source of food. The pastures are mainly fed by the heavy dews, for no winds from the sea penetrate into the mountain valleys. Kabul, the capital, has quite a number of lesser industries, notably carpets and silks, but its main importance is its position at the western approach to the Khyber Pass.

Baluchistan consists of a dry limestone plateau. The northern part along the Afghan frontier is British territory, the southern part being occupied by native tribes under British control. Pastoral occupations and allied industries are similar to those of Afghanistan, and Kalat

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is the route centre. A railway runs to Quetta from the Indus valley and on to Duzdap, in Persia.

Persia. This extensive country may be described as consisting of the narrow lowlands along the coasts of the Caspian Sea and the Persian Gulf, with a broad plateau between them. Much of the latter is desert, so that the population is scanty—only about ten millions, a third of which is nomadic. The Elburz Mountains, with the volcanic peak of Mount Demavend (18,600 feet), confine along the narrow coastlands of the Caspian the most fertile part of Persia. The northern slopes extract rain from the north-east winds, and are wooded. The high summer temperatures allow cultivation of rice, cotton, and fruit in the clearings, and silk is also produced. Resht and Barfrush are the chief market towns. The rest of the country is mostly poor steppe, passing into desert. Wandering herdsmen follow their sheep and goats and camels, and sometimes raid the population settled in villages, where fine fruits, peaches, apricots, nectarines, and grapes are cultivated on the irrigated lands. The mulberry-tree is widely grown. Underground canals, called *kanats*, are common near most centres. They reduce the loss of water by evaporation, but are often in a poor state of repair. As in Turkestan, bread, fruit, and milk are the chief articles of diet. Ranges of barren mountains cross the plateau, and the herds move from the plains to the pastures of their lower slopes as summer advances. But winters are severe, as much as 30° F. of frost is experienced, and the daily range of temperature is great, so that flocks and herds must then be sheltered in the valleys. At the foot of Mount Demavend, on the southern side, stands Teheran (350,000), the capital and route centre for the whole country. Isfahan (100,000) is an interesting old capital, with irrigated lands growing fruit, grain, and tobacco. Shiraz is an oasis, famous for its poets, nightingales, and roses, and for the royal tomb of Darius at Persepolis. Bushire is a rather poor port,

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with a trade in carpets, rugs, shawls, fruits, and other produce of the country.

The main roads from Teheran are as follows:

(1) Southward through Isfahan and Shiraz to Bushire, on the Persian Gulf; or through Yezd and Kerman to Bandar Abbas, on the Strait of Ormuz. This route runs through many carpet-making centres.

(2) To the west through Hamadan and Kermanshah,

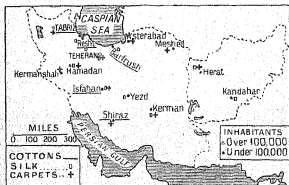


FIG. 293. THE IRAN PLATEAU: TOWNS AND INDUSTRIES

both markets for carpets, leather, and gum, to Khaniqin, the projected railhead for the railway to Baghdad.

(3) To the north through Kazvin to Enzeli on the Caspian, or to Tabriz, Erzerum, and Trebizond for Constantinople, or to trans-Caucasia and Russia.

Tabriz (180,000) is the chief town of the north, the most prosperous part of the tableland and the terminus of the Russian railway from trans-Caucasia. Cotton, tobacco, and cereals are cultivated.

Meshed, on the road to Ashkhabad, in Russian Turkestan, is the burial-place of Haroun-al-Raschid of *The Arabian Nights*. It is a sacred city for one of the Mohammedan sects. Its carpets, velvets, and silks attract Russian merchants.

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Persia is rich in petroleum, which at present is worked at Maidan-i-Naftun, in the region 200 miles to the north-east of the Tigris-Euphrates mouth, to which it is conveyed by pipe-line. Abadan is the town at the mouth, with refineries, but tank steamers collect it also at Mohammerah, on the Karun river. The annual production exceeds 5,000,000 tons.

IRAQ

The country more popularly known as Mesopotamia is the fertile lowland of the Euphrates and Tigris, forming a vast oasis between the dry highlands of Iran, Arabia, and Kurdistan. The traditional position of the Garden of Eden lies near the old confluence of the rivers, and the story indicates how its possibilities stirred the imagination of the ancients. Neglect and misrule for centuries has turned the garden into either a swampy plain or desert. It can be restored to great productivity, for such crops as cotton, to-



FIG. 204. THE VALLEY OF OIL
Part of the Anglo-Persian Oil Company's great field in Persia.
Reproduced by kind permission of the Anglo-Persian Oil Company, Ltd.

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bacco, and mulberry for silk, only by the irrigation of its water-supplies, which are sufficient to maintain 10,000 square miles of tilled land in winter, and quite half that area even in summer, mostly in the Baghdad area. But agriculture requires a hard-working, settled population, which in turn demands security against robbery of its harvests by less fortunate neighbours. So that the prosperity of Iraq depends entirely upon strong government. Once this is assured Iraq can become as prosperous as Egypt. The present population is less than three millions.

The rivers are tidal for forty miles above Basra, and this tidal water bays back the river-water, which, thus checked, deposits its alluvium and causes the river to flood its banks. Winter frosts and summer heat pulverize this alluvial soil into fine particles, rich in plant foods. Both rivers bring down, therefore, great quantities of silt. They are fed by the winter snow and rains of the mountains, and flood early in summer, but the Tigris maintains a more even flow, thanks to its left bank tributaries from the Zagros Mountains. Practically all the towns lie along its banks, while for hundreds of miles the Euphrates is deserted. Temperatures range from 90° F. in summer to 50° F. in winter, but for half the year the temperature is about 60°, which is suitable for winter crops of wheat, as in India. At present most of the land is steppe in spring and early summer, but soon becomes brown and parched. In the north it is cooler, but although it receives more rain—about ten inches—it is dusty and stony, and irrigation is necessary.

Baghdad stands on the Tigris, where it approaches closely to its neighbour, and the significance of this site is shown by the proximity of the ruined cities of Seleucia, Ctesiphon, and Babylon. For not only is the water of both rivers available for irrigation, but both could be utilized as highways. Farther to the east a pass provides access through the Zagros Range to Persia.

In the same way Mosul, in the north, stands near the

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site of the Assyrian capital Nineveh, close to the confluence of the Zab tributary. Tracks from the highlands and the Mediterranean coast converge upon it. It is therefore the chief market of the upper basin. The Baghdad railway reaches the river at this point, where too coal and iron have been found. A number of oil-wells have been drilled with promising results, chiefly in the north-east, round Kirkuk.

Basra is the port for the country and the terminus of the railway. Although it is sixty miles from the sea, the combined river called the Shatt-el-Arab is half a mile wide and deep enough for ocean-going steamers to ascend. Barley, dates, wool, hair, and carpets are exported, and cotton goods, sugar, and iron and steel goods arrive to be sent up country.

ARABIA

The huge plateau of Arabia, with its lofty escarpment rising in the south-west to over 9000 feet, is habitable only along the coasts and in the oasis areas, such as the Nejd, a central ridge cut by deep valleys. Little is known of the interior of this million square miles of country, for its population, though small, consists of Bedouin tribes, who wander with their flocks from well to well and are little disposed to welcome intruders. Much of it is true desert, like the Sahara, of which it is really a part. Its coasts, however, where more water is available from mountain drainage, overlook the great highway of the Red Sea, and the Arabs have been great sailors and traders from time immemorial. Their work in astronomy, mathematics, and other sciences has left its mark in the very names of the terms of these studies.

The Yemen, in the south-west, is the most populated part. The mountains serve both to extract rain from the south-west monsoon and to protect the coast from the cold north-east winds. The mountain slopes are terraced to the top, to obtain the full benefit of the rain and the

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mist which forms before noon, and which acts as a screen till the greatest heat is past. The volcanic soil, similar to that on the Deccan, grows excellent fruits, and two or three coffee crops a year. Hodeida and Mocha are the coffee ports.

Aden is a British coaling station. It is built on a volcanic peninsula, and suffers from intense, dry heat. Nothing grows. Provisions are imported, and water is obtained by distilling sea-water. But it has a fine harbour, which attracts trade from Somaliland, and shipping brings the cotton goods of India and Britain to exchange for the coffee of Arabia.

Oman, the south-east coastal district, and El Hasa are similar regions, with a considerable trade in dates, which are exported from Muscat and Al Kuwait. The **Bahrein Islands** are British, and form a useful base for keeping watch on the pirates of the Persian Gulf. They are also the base of pearl-fisheries.

The Nejd, with its main valley the Kasim, is the home of the typical Arab horse, the patient, hard-working donkey, and the one-humped camel, which are bred on the oases, where wheat, barley, dates, and fruit are cultivated. The Sultan is the most powerful ruler of the peninsula, exercising the nearest approach to control of the whole peninsula that has ever been possible. Even the former kingdom of the Hejaz, which occupies the northern half of the coastal region of the Red Sea, recognizes his authority. But Yemen and Oman are independent.

A railway runs from Damascus, in Syria, to Medina. Jiddah is the west coast port. But the importance of both Medina and Jiddah lies mostly in the diminishing pilgrim traffic. Mecca was the birthplace, and Medina the burial-place, of Mohammed, whose teaching, contained in the Koran, requires of the faithful a visit to Mecca. Caravan routes from Persia and Mesopotamia lead to these holy places *via* the Nejd.

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PALESTINE AND TRANS-JORDANIA

Palestine, in western eyes, is the home of the Jews, but in reality the Jews form only a fifth of the population of 816,000, the Moslems forming the majority of the mixed races and religions. This fact makes Britain's task of government under the mandate difficult.

Although not much larger than Wales, the country has very great importance: (1) as guarding the great but narrow highway to Egypt; (2) historically for its religious associations, for Jews, Christians, and Moslems alike. If Belgium is the cockpit of Europe, Palestine has that unenviable distinction for Asia. The Jews tried in vain to avoid the conflict of the ancient empires—Egypt, Assyria, Babylon, Greece, and Rome. Since those days Crusader and Turk, Napoleon and Allenby, have marched armies across it. Palestine, then, can exist only under the protection of strong government.

Physically the country falls into four longitudinal divisions: (1) the maritime plain; (2) the central uplands; (3) the Jordan rift valley; and (4) the highlands of Trans-Jordania. Great differences in both the climate and the character of the country exist within a small space. Sir G. Adam Smith writes:

There are palms in Jericho, pine-forests in Lebanon. In the Ghor in summer you are under a temperature of over 100° F., and yet you see glistening the snowfields of Hermon. All the intermediate steps between these extremes the eye can see at one sweep from Carmel—the sands and palms of the coast; the wheatfields of Esdraelon; the oaks and sycamores of Galilee, the pines, peaks, and snows of Mount Lebanon. Take a section across Judæa. With its palms and shadoofs, the Philistine plain might be part of the Egyptian delta, but on the hills of the Shephelah which overlook it you are in the scenery of Southern Europe; the Judæan moors which overlook them are like the barer uplands of central Germany; the shepherds wear sheep-skin

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cloaks and live under stone roofs; sometimes the snow lies deep; a few miles more and you are down on the desert among the Beduin with their tents of hair and their cotton clothing; a few miles farther still and you drop to the torrid heat of the Jordan valley; a few miles beyond that and you rise to the plateau of the Belka, where, as the Arabs say, 'the cold is always at home.'¹

This longitudinal division is cut by lateral divisions—*e.g.*, the plain has three well-defined parts: (a) the plain of Acre, twenty miles by four, very fertile and well watered; (b) the plain of Sharon, between Cæsarea and Jaffa, forty-five miles long, six to twelve miles wide, famous for its beauty and fertility; (c) the plain of Philistia, forty miles long and, at Gaza, fifteen miles wide, chiefly good steppe, brilliant with flowers in spring, with olive cultivation, and the fragrant orange-groves in the best parts. The plateau is similarly separated in parts by deep ravines, most noticeably in the vale of Esdraelon, separating Samaria from Galilee. Most of the plateau is limestone, with only dry pasture-land for sheep and goats, except where terraced and planted with olives and vineyards. The milk and honey of which the Bible speaks are typical steppe products—honey from the early flowers.

Jerusalem (63,000) stands on the mountains as high as the summit of Snowdon, while the surface of the Dead Sea to the east lies 1300 feet below sea-level. It is a wonderful, walled city, with definite quarters for Jews, Christians, Moslems, and Armenians. From the coast at Jaffa a railway winds its way with difficulty to the Holy City, with the Christian Church of the Holy Sepulchre and the beautiful Mohammedan mosque on the old Temple site. But Haifa is the chief port. It nestles under the shelter of Mount Carmel. A railway from Egypt along the plain brings to it the oranges, barley, wine, lentils, and melons of the coast. Sugar, rice, petroleum, and

¹ *The Historical Geography of the Holy Land*, 25th edition, p. 57.

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cotton goods arrive for distribution inland. The railway continues to Acre, but a more important line runs along the Esdraelon plain, fertile and open to the winter rains,

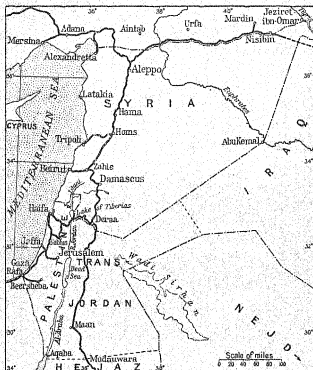


FIG. 295. PALESTINE AND SYRIA

From "The New World: Problems in Political Geography," by Isaiah Bowman (The World Book Company, Yonkers-on-Hudson, and George G. Harrap & Co., Ltd., London)

round the south of the sea of Galilee to join the line from Medina to Damascus. The valley of the Jordan between the Sea of Galilee and the Dead Sea, about sixty-five miles long, is merely a deep rut cut into the bottom of the rift. The river is black and sullen, bordered with slimy mud-

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banks, bordered in turn by unhealthy jungle in the lower part. Fords are few. The Dead Sea shores are quite barren.

Big schemes are in hand to utilize the potash salt deposits of the Dead Sea, and there are many small industries—soap, tobacco factories, and flour-mills—but the prosperity of Palestine depends more upon peasant industries, and, as we have seen, the only hope of a flourishing agriculture is peace between the races and security from raids.

Trans-Jordania has an Arab administration under British guidance. For a width of thirty to eighty miles it is fairly fertile, but fertility decreases steadily eastward. There are masses of volcanic rock, some weathered into red, fertile soil as in the Hauran, some wild and waste. The hills of Gilead have a fertile soil of crumbly limestone, beautiful scenery, and a bracing climate.

SYRIA

Much of what has been said about Palestine applies also to Syria, the government of which the French, who hold a mandate from the League of Nations, are finding difficult. But in Syria the tableland descends steeply to the coast, and there is practically no plain. The rift valley between the Lebanon and Anti-Lebanon is drained by the Orontes flowing north, and the Leontes flowing south, each cutting transverse valleys to reach the Mediterranean. It is an important country, forming the connecting link between Iraq, Egypt, and Asia Minor.

Large crops of wheat, barley and millet, vegetables and fruit, including mulberry, are grown, and cultivation of cotton, tobacco, hemp, and sugar is extending. Other industries are similar to those in Palestine, but silk production in the north is considerable. The crops are raised along the coast and on the oases. The highlands are covered with large cedar-woods. There is a big industry in the rearing of sheep as well as camels and goats. Raw

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silk, sheep and cattle, oranges and lemons, are exported, while the imports are as in Palestine.

Damascus, a large oasis at the edge of the desert, is the capital. The water is brought by two streams, the Biblical



FIG. 296. THE CEDARS OF LEBANON, IN SYRIA

Photo Will F. Taylor

rivers Abana and Pharpar, from snow-capped Mount Hermon. After passing through Damascus, water flows to lakes eighteen miles farther east and is absorbed. Caravan routes pass east to Baghdad, south to Medina, north to Aleppo, and west to Beirut, the last three now being served by railway. There is also the railway which crosses the

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Jordan to Haifa. The old capital was Antioch, on the Orontes. Alexandretta is the port. Aleppo is another railway and route centre, with iron- and salt-mines.

TURKEY, ARMENIA, AND GEORGIA

The plateau, which is crossed by east-west mountain ridges, is all that remains of the great Empire of Turkey, and is now a republic, with a total population of 14,000,000. The Taurus range, in the south, rises in places to 10,000 feet, and along the north the Pontine range descends steeply to the Black Sea. The average height of the plateau is about 3000 feet in the west, rising to 6000 feet eastward. The rivers rise in the east and flow westward, some turning northward to the Black Sea. Their upper courses are in deep, steep valleys. Some fail to reach the sea.

The Pontine Mountains have woodlands of oak, beech, and fir, and the west coast, with its many good harbours, is also well wooded.

In the river valleys, and where the south coastal plain broadens out, agriculture is practised. But methods are still primitive. Tobacco is an important crop, particularly round Samsun, on the Black Sea coast, and 40,000 tons a year are exported. Cereals, Mediterranean fruits, liquorice roots, and linseed are also grown and exported. Silk production, round Brusa and Istanbul, and cotton, on the fertile plain of Cilicia, are important.

Very little of the reported mineral wealth of the mountains is worked. But there are some silver, borax, coal, and copper mines, mostly under Government control, beaten copper and brass work being one of the Turkish handicrafts.

The mountains are more important for the pasture they provide for some 20,000,000 sheep and goats, 4,700,000 cattle, and over 2,000,000 asses, and horses, camels, and buffaloes. The fine hair of the famous Angora goat is used

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for making mohair cloth and the wool for rugs and carpets. An attempt is being made to establish textile and other factories. The sponge-fisheries are valuable, realizing £2,500,000 a year.

Angora (75,000) is now the capital. It is a market centre in the north-west of the plateau, with a railway to Istanbul (Constantinople). But Smyrna (154,000) is the largest and most important town, although it suffered a disastrous fire in 1922. It is the chief port of the country, and one of the starting-places of the Baghdad railway, from which a connecting link runs north-east to Angora. The valleys behind Smyrna produce some of the finest figs and sultanas. These are exported, together with tobacco (from Latakia), carpets, and valonia.

From Istanbul and Smyrna converging roads lead across the plateau to Konia and Aleppo, the route now followed by the railway. Roads everywhere are poor, and caravans of mules and camels travel well armed. Sivas and Cæsarea are other central markets. From Sivas a route runs through Diarbekr, on the upper Tigris, to Mosul. Trebizond, on the Black Sea, is a poor port, forming the terminus of the Persian route from Teheran and Tabriz, through Erzerum, the chief town, in the Soviet republic of Armenia. A railway joins Erzerum to Tiflis, in Georgia, another of the three republics in trans-Caucasia which gained their independence after the War, but have since become federated to Soviet Russia. They are:

	AREA IN SQUARE MILES	POPULATION
Armenia	15,065	1,340,000
Georgia	25,470	2,135,000
Azerbaijan	33,570	2,463,000
Total	74,105	5,938,000

The whole region is extremely mountainous. The uplands of Armenia particularly have a severe climate, but agriculture and silkworm-breeding are carried on in

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the fertile valleys. Mount Ararat (16,925 feet), where, according to tradition, Noah's Ark rested, is the culminating peak of the ranges referred to above. Erivan, the capital, has an electric power-station. In Georgia, the capital of which is Tiflis (293,000), agriculture is also the chief occupation, but forestry and mining are also very

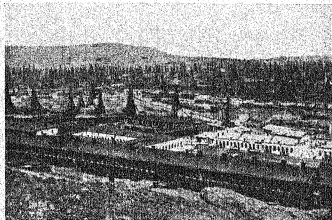
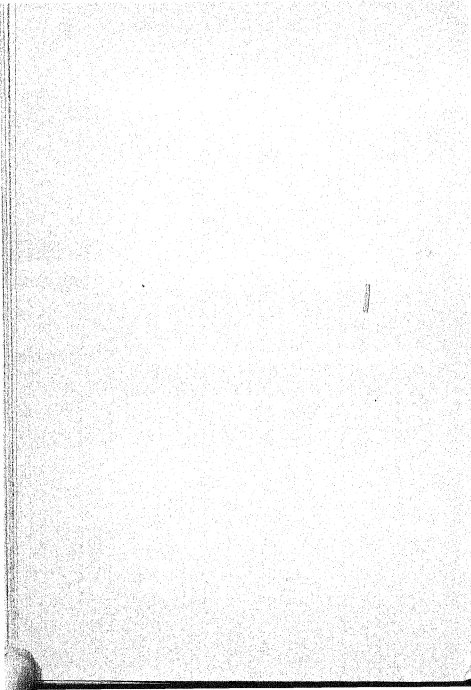


FIG. 297. THE BAKU OIL-FIELD

Each of the wooden funnels covers a bore-hole, up which the crude oil flows or is pumped. Notice the absence of trees and shrubs.

Photo E.N.A.

important. The beds of manganese ore found in the west of the country are the richest in the world. In the same district good coal is also worked. The port of Batum is connected by petroleum pipe-line and railway to Baku (452,000), the capital of Azerbaijan. This republic produced over 7,500,000 tons of oil in 1927-28, and is rich in many other minerals. But agriculture is the main industry, for the climate is temperate throughout the year. The chief crops are cotton, grain, and grapes. The Caspian fisheries also yield a rich harvest.



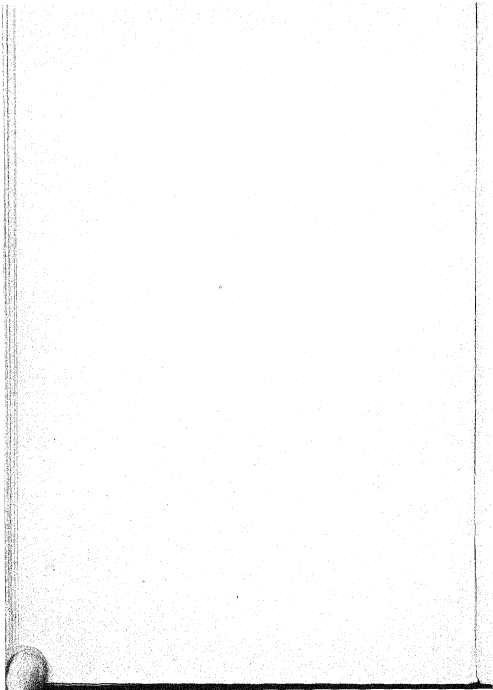
APPENDIX

As frequent mention has been made of the area of various parts of the British Isles, the following table is provided for ready reference.

Note that while the term 'British Isles' includes the whole area, the 'United Kingdom' no longer includes the Irish Free State, and 'Great Britain' does not include any part of Ireland.

	AREA IN SQUARE MILES	POPULATION (Census 1931)
England	50,874	37,354,917
Wales	7,406	2,593,014
Scotland	30,405	4,842,554
Total for Great Britain	88,745	44,790,485
Northern Ireland	5,237	1,256,561 ¹
Total for the United Kingdom	93,982	46,047,046
Irish Free State	26,601	2,971,992 ¹
Isle of Man	221	49,338
Channel Islands	75	93,061
Total for the British Isles	120,879	49,161,437

¹ Census 1926.



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